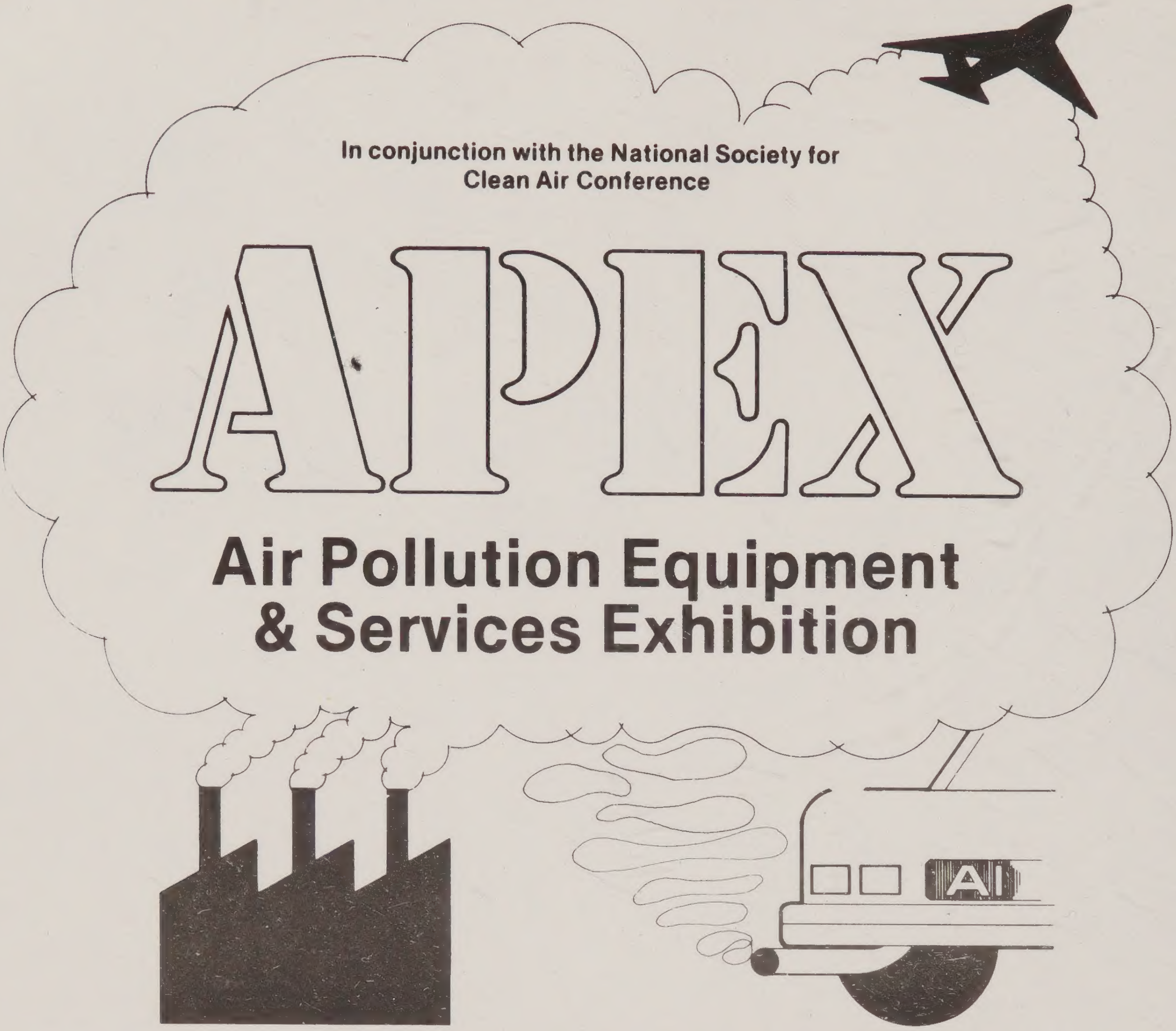
CLEAN AIR

VOL.11 NO.1



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CLEAN AIR

THE JOURNAL OF THE NATIONAL SOCIETY FOR CLEAN AIR

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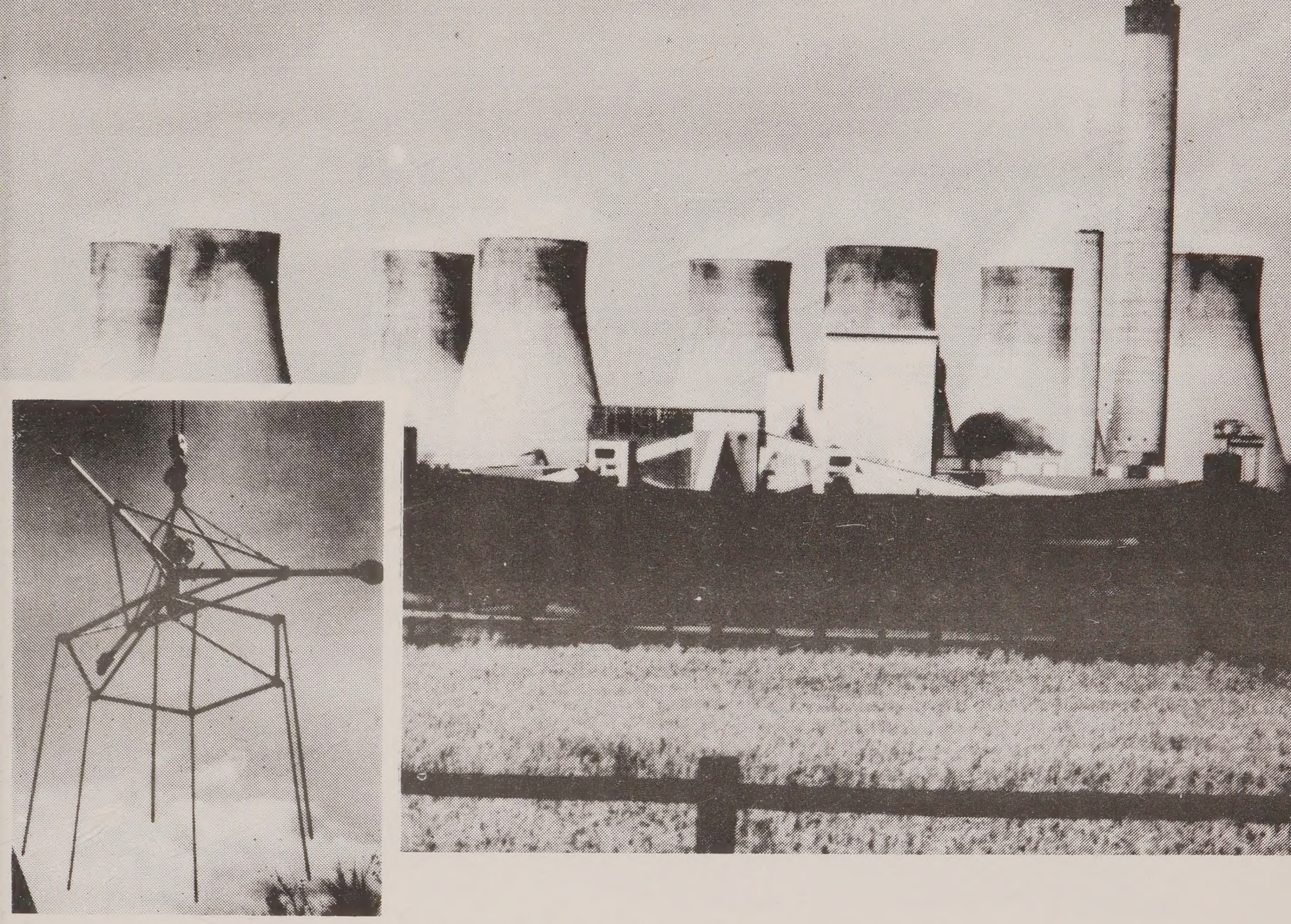
CLEAN AIR is the official journal of the Society, but the views expressed in contributed articles are not necessarily endorsed by the Society. Abstraction and quotation of matter are permitted, except where stated, provided that due acknowledgements, including the name and address of the Society are made. Technical articles of full page length, or over, in CLEAN AIR are indexed in Current Technology Index. Abstracts are included in Environmental Periodicals Bibliography (EPB).

NOISE WATCHDOG SCRAPPED

The abolition of the Noise Advisory Council was announced on 12th February 1981 by Giles Shaw, Parliamentary Under-Secretary of State for the Department of the Environment. The Government took this step "as a result of their continuing review of the role of advisory bodies" but Mr. Shaw pledged the Government's determination to contain noise nuisance and reduce it wherever possible. "We fully recognise the difficulties and distress which can be caused to the public by noise from all kinds of activities, and we shall continue to seek solutions to the more pressing problems, taking advice from appropriate sources as necessary."

It is essential that the Government takes the advice of organisations such as the National Society for Clean Air and the Environmental Health Officers Association. Environmental health officers are spending an increasing proportion of their time on noise control, and should be able to put their views to Government as strongly as possible. The new powers provided by the Local Government Planning and Land Act 1980 go some way towards recognising that specifically local problems are best tackled at local level. However, noise control is largely technical and it is a great advantage to be able to pool knowledge of problems and their control. Government should recognise the wealth of expertise that exists both in industry and among local authorities which can be brought to bear on problems of noise control.

The great strength of the Noise Advisory Council lay in the breadth of interests represented by its members, so that the opinions of a cross-section of the community could be laid directly before the Secretary of State. The National Society for Clean Air, with a membership which includes industry and local authority, is particularly well placed to give all round advice to the Government, and draw attention to a range of problems. Moreover, the Society's affiliation to the International Association Against Noise ensures that it is kept abreast of developments in Europe and elsewhere. Most importantly, the Society provides a forum for the debate of noise matters at its annual conferences, workshops, and meetings, at divisional and national level.



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LEVELS OF CARBON MONOXIDE EXPERIENCED CYCLING IN CENTRAL LONDON

by

Mark Pyman*

INTRODUCTION

When discussing with London commuters the merits of cycling to and from work, the most common reason given for preferring other forms of transport to and from work was that the levels of noxious fumes on the road were thought to be so great that exposure to such fumes whilst cycling would result in damage to health. This study was initiated when the author found that whilst there was plenty of published work on the exposure of car drivers to noxious fumes (particularly CO, SO_2, NO_x, Pb and O_3) and on the levels experienced at fixed monitoring stations, there was very little known about what a cyclist is actually exposed to.

It was decided to use carbon monoxide (CO) as a guide to the level of noxious fumes experienced, and to measure the exposure of a cyclist to carbon monoxide on a regular route into and out of central London during the rush hour period.

METHOD

A continuous carbon monoxide analyser (Ecolyser type, model 2100) was used in conjunction with a data memory (Phillip Harris Ltd), the stored data being written out to a strip chart recorder at the end of the journey. The input to the analyser was through a 3" diameter filter funnel mounted at head height at the front of the bicycle, and ¼" internal diameter polythene tubing and a millipore filter. The analyser and data-logger were mounted in a case placed on the rear carrier of the cycle (a Raleigh RSW 16), the whole arrangement being as shown in Figs 1 and 2. Normally the analyser output (range 0-100 ppm) was logged at 300 readings per hour and replayed at 30 readings per minute onto a chart moving at ½ mm per second.

The analyser was calibrated using carbon monoxide calibrating gas (53± 1 ppm) immediately before the journey to work, on arrival at work, and immediately after returning from work in the evening. The analyser was zeroed before each journey to work.

The route taken was always the same, starting from West Hammersmith, W6, and finishing in Buckingham Palace Road, SW1.

The route was in three sections. In to work: W. Hammersmith along King Street, Hammersmith Broadway, Hammersmith Road and Earls Court Road to the Cromwell Road (2.6 miles): Cromwell Road (1.3 miles), and then to Buckingham Palace Road via Pont Street and Lyall Street (1.0 miles).

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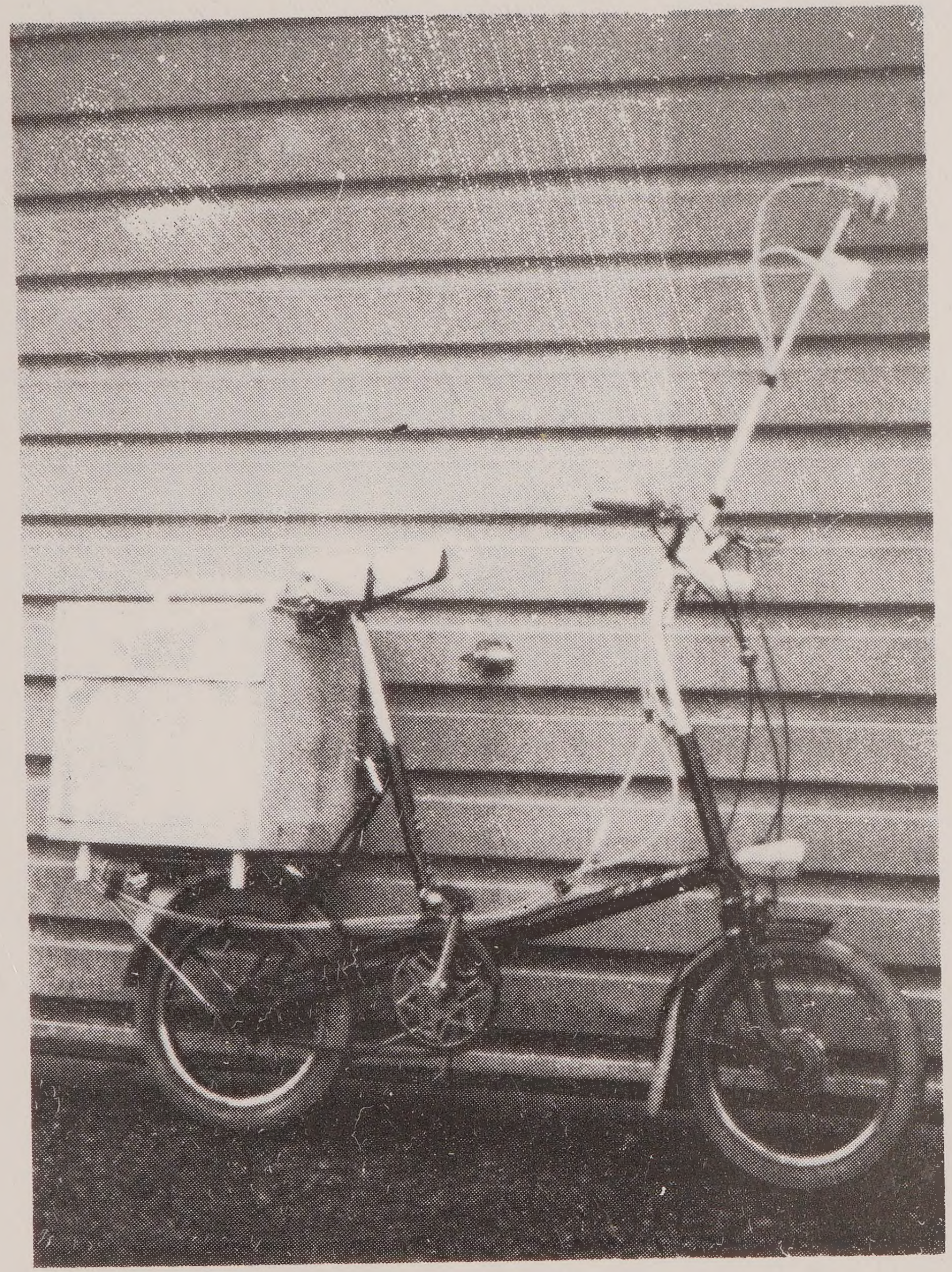

Fig 1 The test bicycle

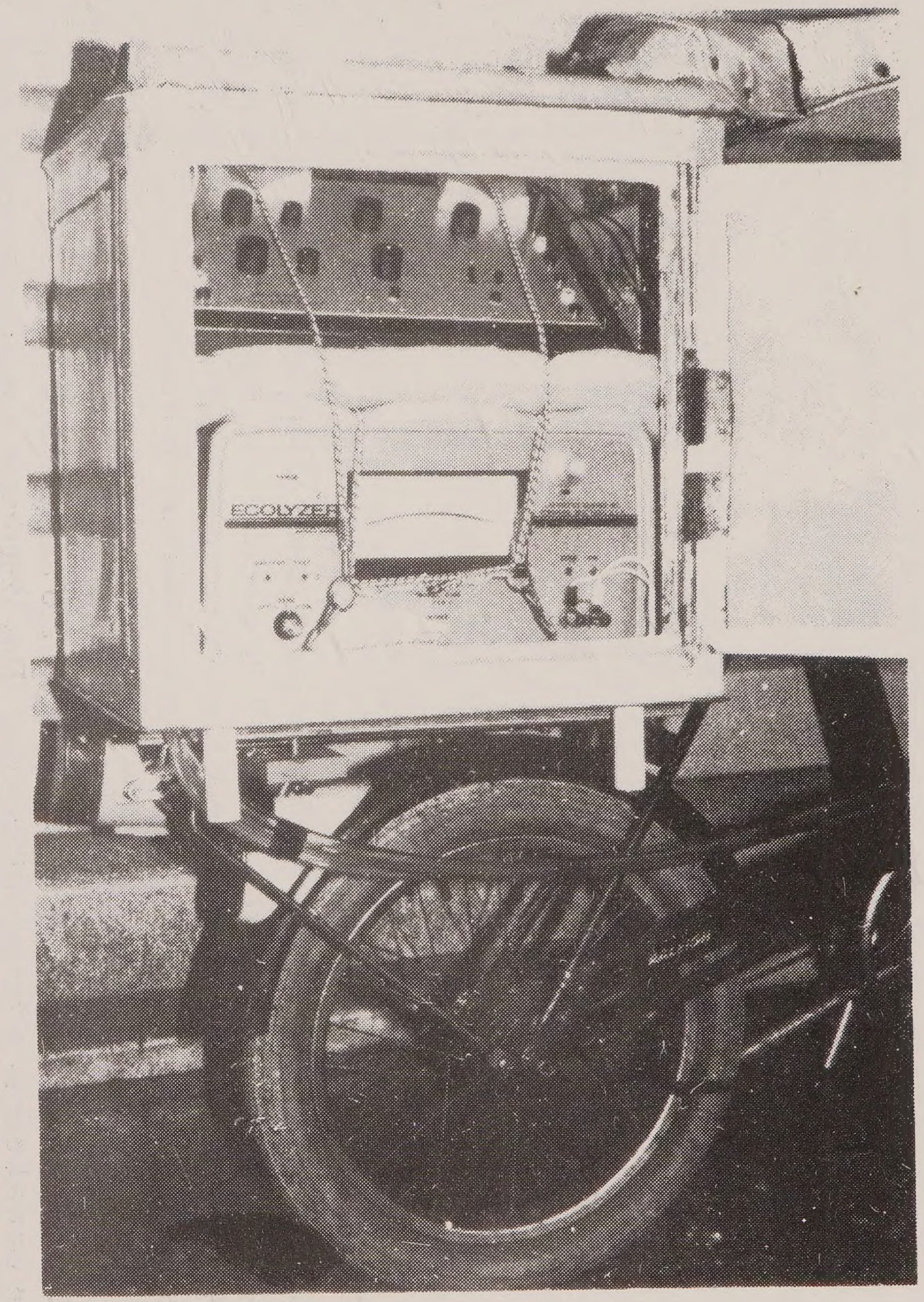

Fig 2 Ecolyser and datalogger in case

On the return journey: Buckingham Palace Road to the Cromwell Road via Sloane Square (1.3 miles); Cromwell Road to Hammersmith Broadway (2.7 miles) and Hammersmith Broadway to Ravenscourt Park (0.9 miles); in both cases a journey of five miles, taking about 30 minutes.

The mean hourly traffic flow between 0700 and 1000 and 1600-1900 (in brackets), estimated from observed mean hourly flows between 1000 and 1600, are as follows for the relevant roads: King Street 1000 (2100), Hammersmith Broadway 5300 (3300), Hammersmith Road 2700 (2600), Cromwell Road 6100 (5900), Pont Street 2400 (2400), Buckingham Palace Road 900 (1100).

The weather conditions (winds, rain, dust, temperature) were noted qualitatively for each journey.

RESULTS

Preliminary experiments were carried out over a period of two weeks to test the performance of the analyser under normal cycling conditions, in order to check that the frequent changes in speed and direction that occur on a cycle did not give rise to spurious peaks of increased background noise relative to a stationary instrument.

To test this possibility, a large reservoir of air with a low carbon monoxide content (exhaled air) was connected to the analyser input to form a closed system and the journey then carried out as if for an ordinary run. This experiment was repeated several times, and the results compared to a control in which the apparatus was largely stationary and partly carried about by hand.

A typical result is shown in Figure 3 with the control shown in Figure 4. It can be seen that whilst the effect of being carried on a moving bicycle does increase the background noise level, the loss in precision is sufficiently small that fluctuating CO levels in a normal traffic environment would be expected to show up satisfactorily.

It was noticeable, however, that the effect of being carried around on a bicycle was to compress the upper range of the response relative to the baseline, as seen by the decreasing levels of the calibrations in Figure 3. This compression, apparent in all the cycle runs, was judged to be unavoidable and allowance made for it in the presentation of the results.

Results from four actual runs are shown graphically in Figures 5-8, where a 'run' consists of both the journey to work and the return journey.

The runs were carried out over a total period of three months from April 1980 – June 1980. The four shown in Figures 5-8 are typical of all the results.

The results showed no observable correlation with wind, rain, dust or temperature conditions, but were clearly directly related to traffic density. In addition, higher carbon monoxide levels were experienced after the evening rush hour than before the morning rush hour.

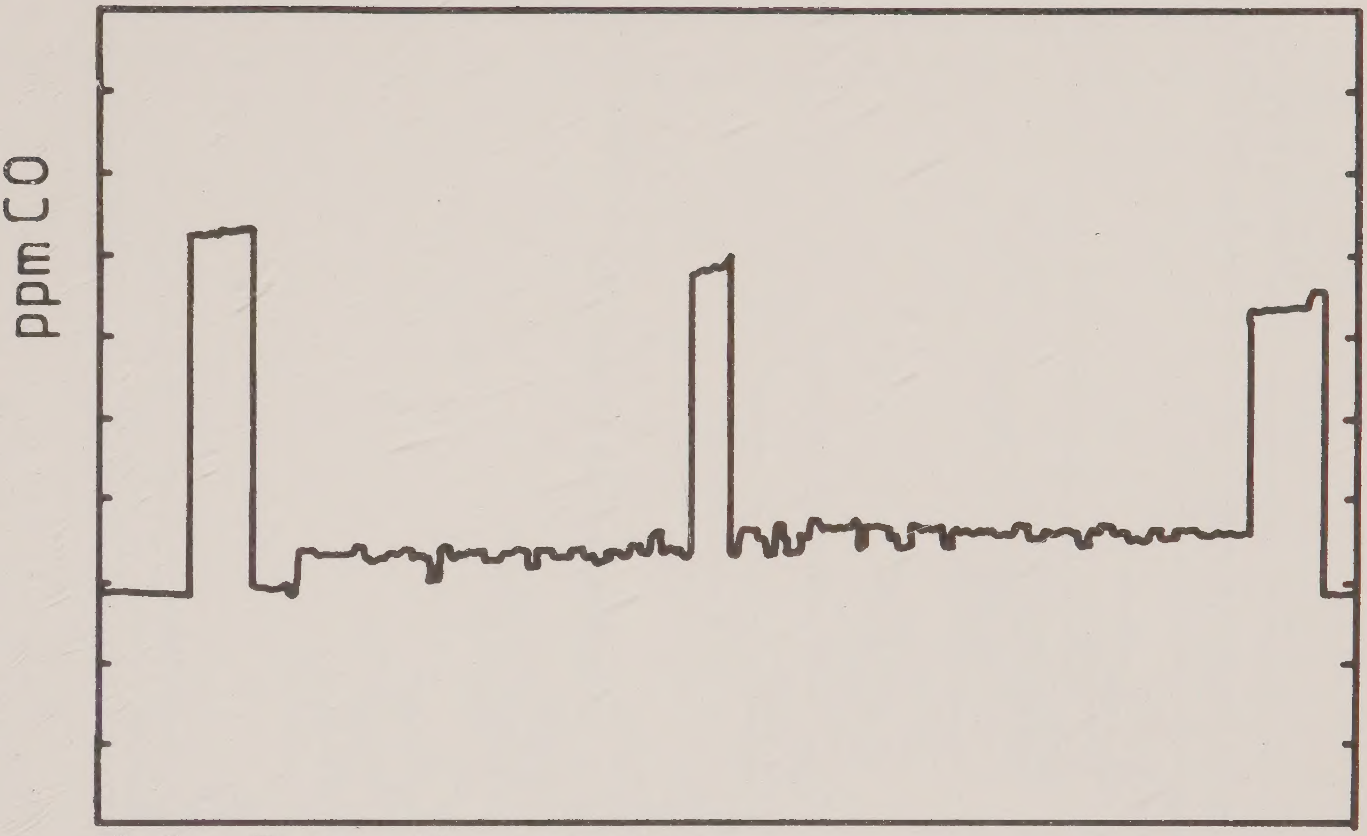

Fig 3 Test run with constant CO input

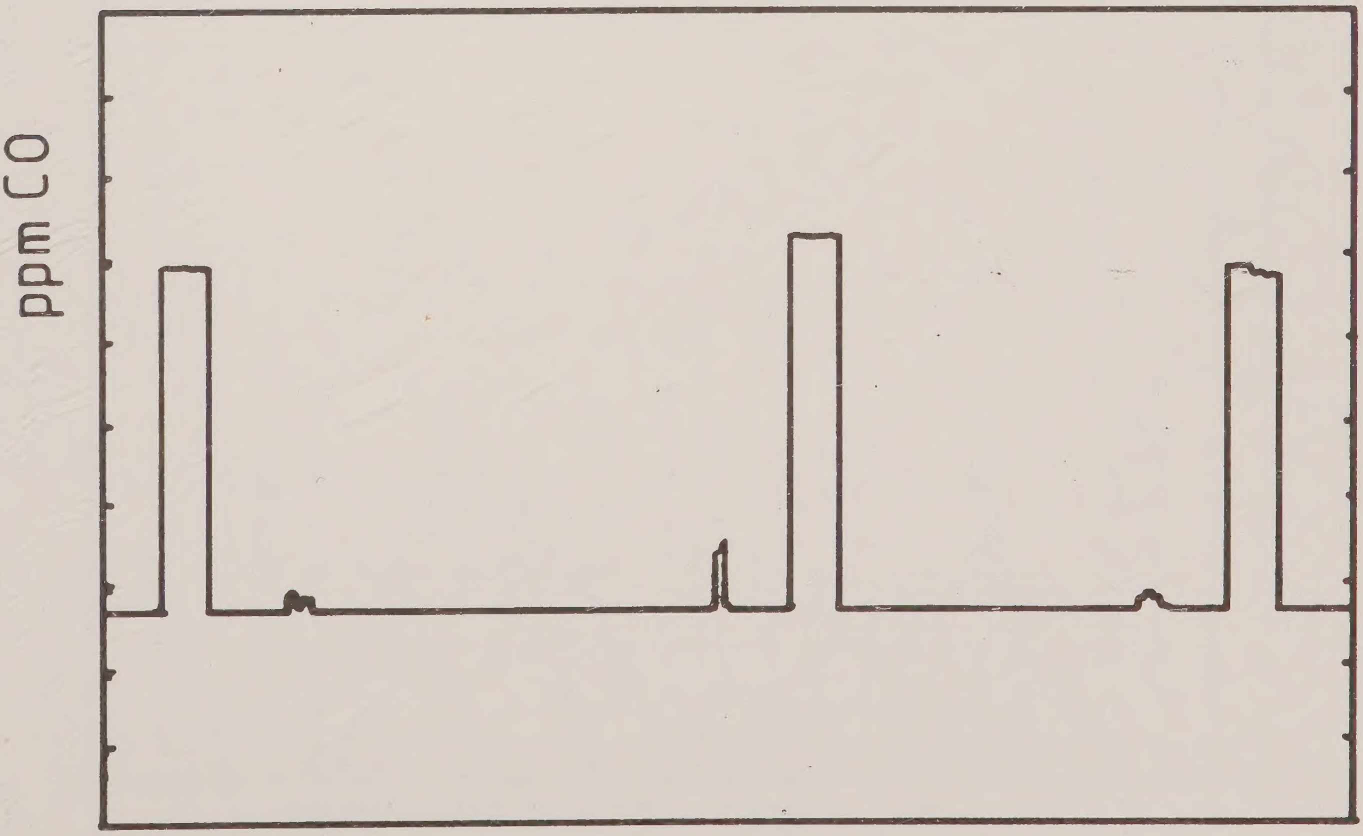

Fig 4 Control run

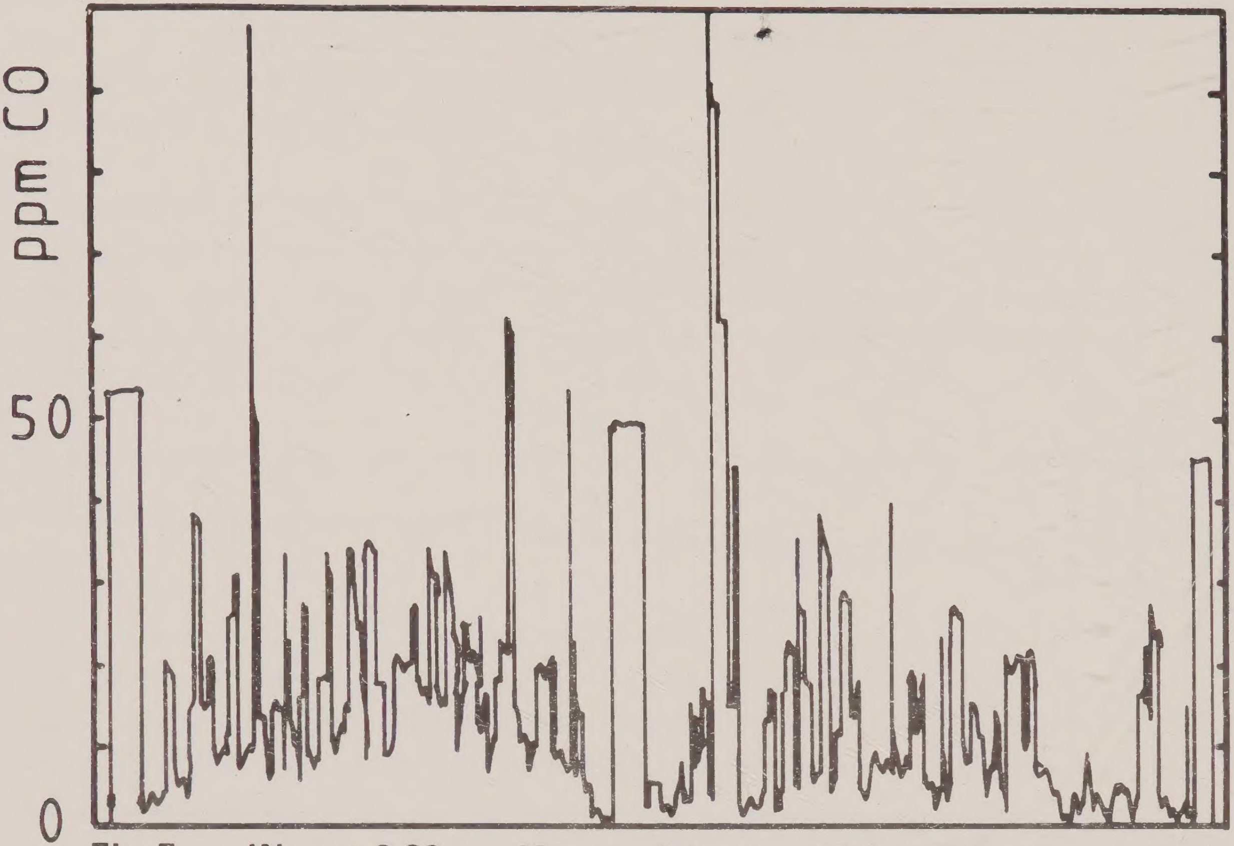

Fig 5 IN : 8.30am Mean = 21 ppm SD = 13 ppm
OUT : 6.00pm Mean = 15 ppm SD = 13 ppm

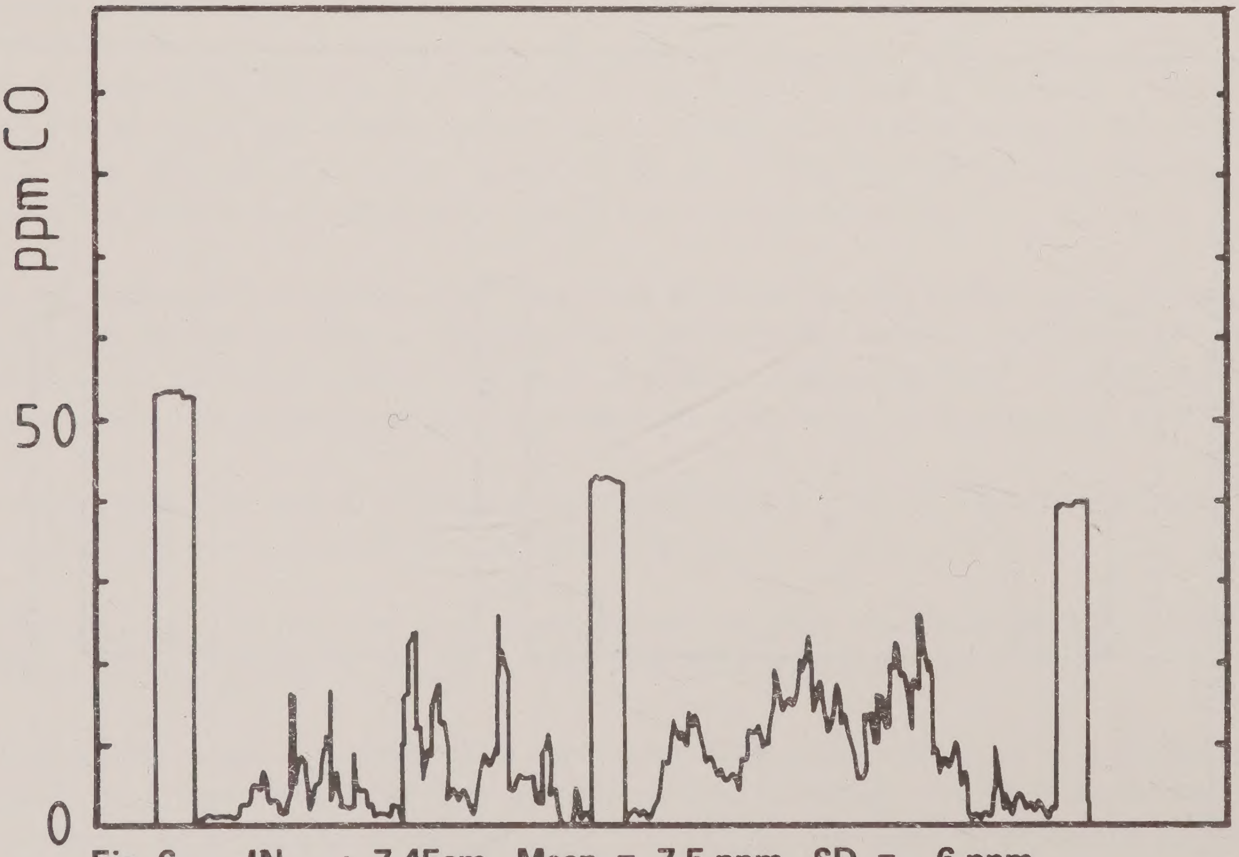

Fig 6 IN : 7.45am Mean = 7.5 ppm SD = 6 ppm
OUT : 7.00pm Mean = 14 ppm SD = 6 ppm

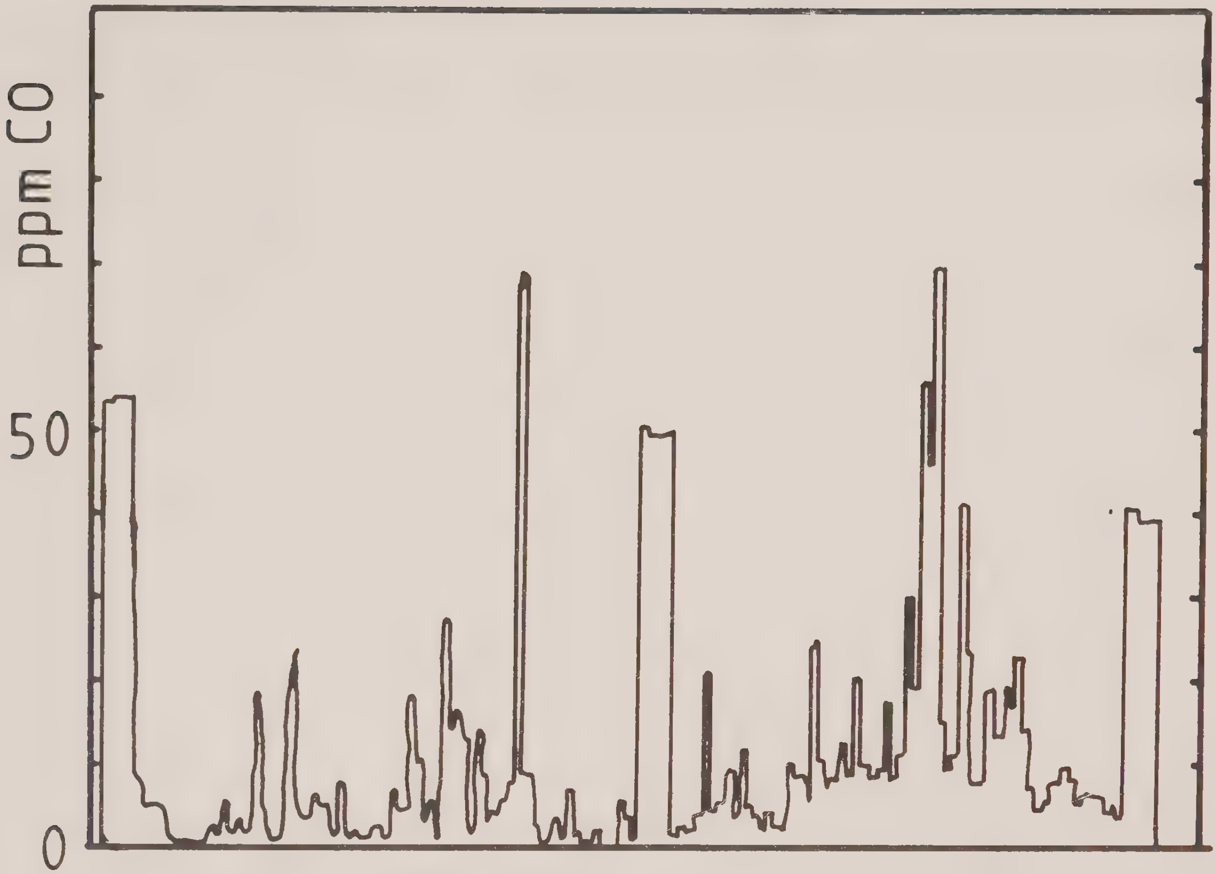

Fig 7 IN : 7.00am Mean = 8.5 ppm SD = 16 ppm
OUT : 7.00pm Mean = 15 ppm SD = 14 ppm

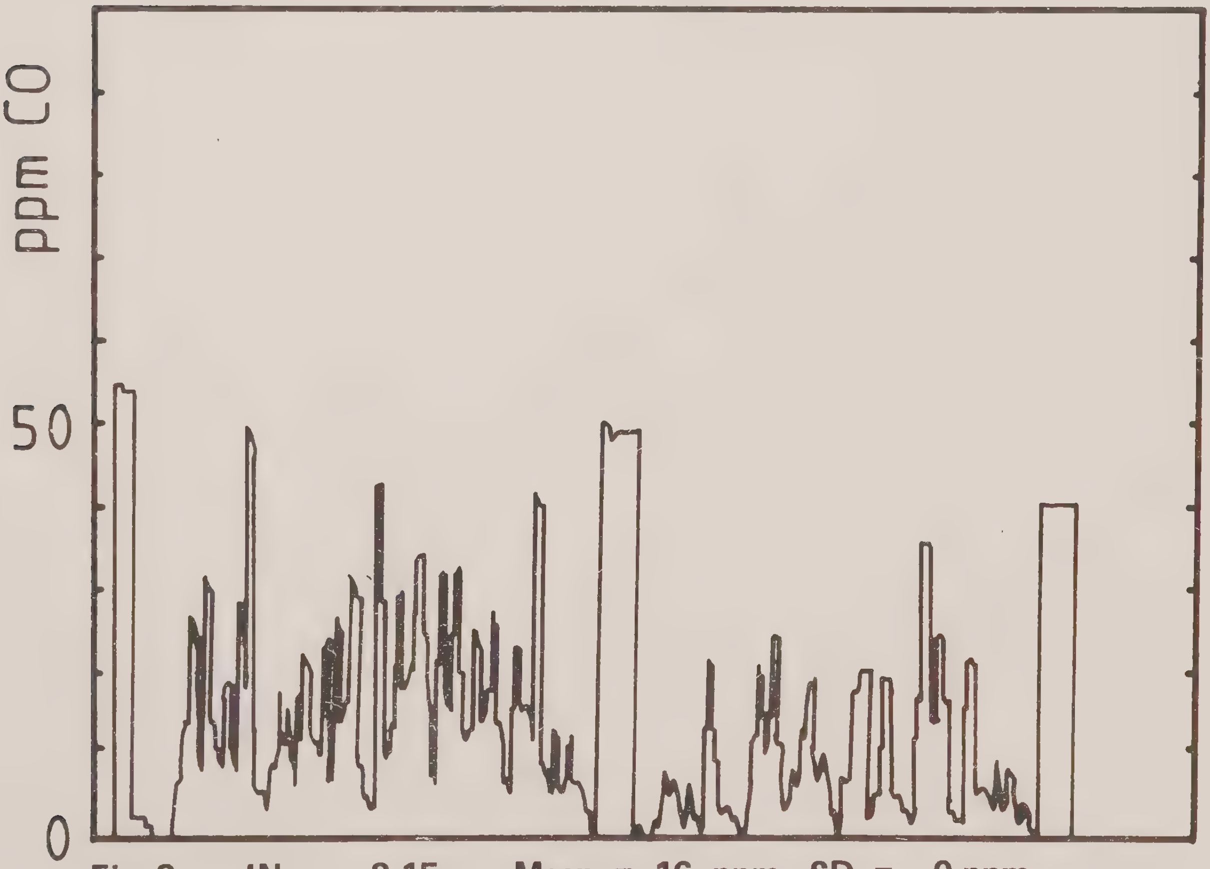

Fig 8 IN : 8.15am Mean = 16 ppm SD = 9 ppm
OUT : 7.00pm Mean = 11 ppm SD = 7 ppm

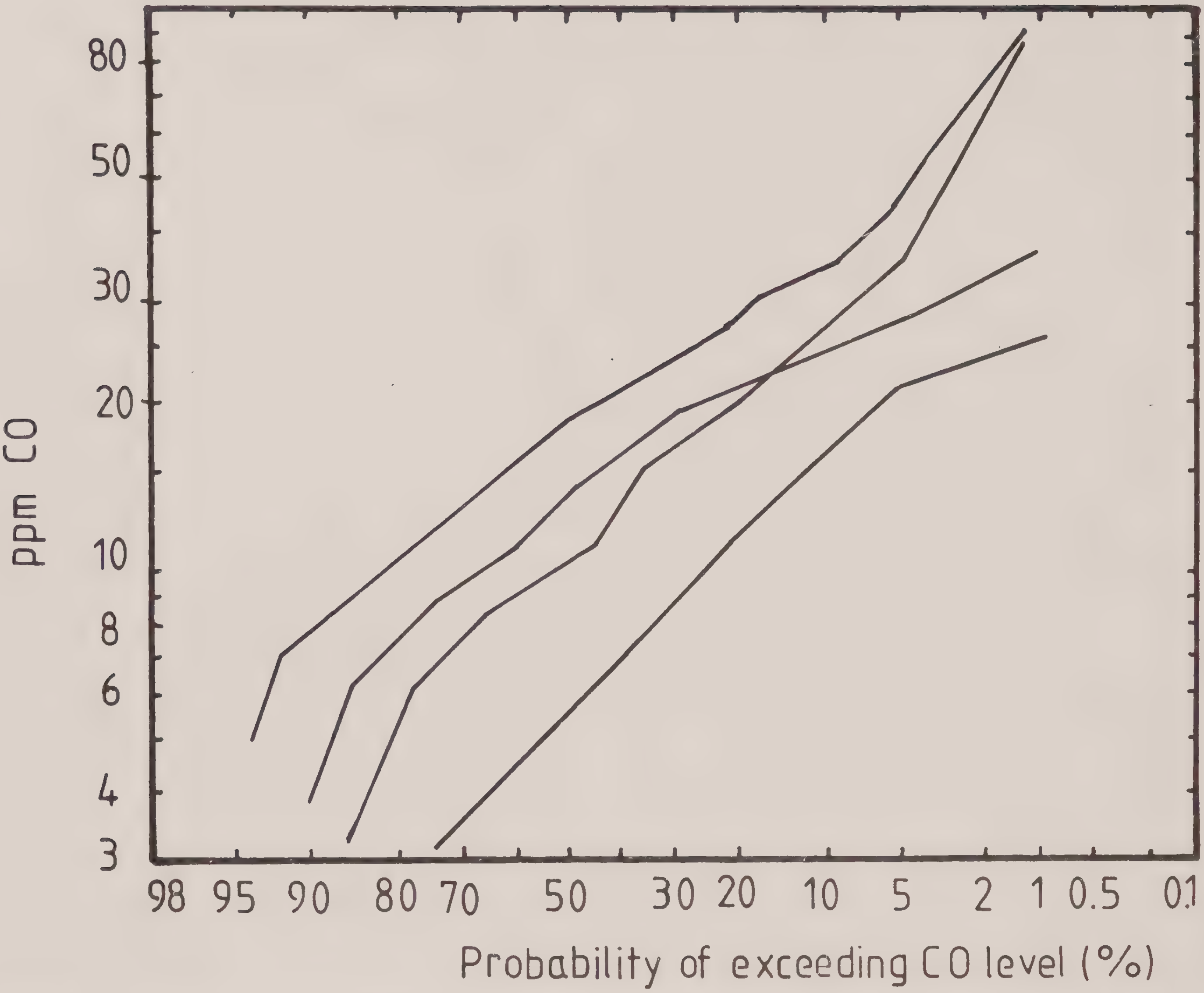

Fig 9 **Plot of the probability of exceeding any given CO level; data from Figs 5 and 6.**

Peak CO levels were in excess of 100 ppm, this being the full scale deflection of the Ecolyser.

The results for two runs (these shown in Figures 5 and 6) have also been plotted in Figure 9 as the cumulative probability of exceeding particular CO levels.

DISCUSSION

The only published studies reporting the carbon monoxide exposure of cyclists that the author is aware of are those of Waldman et al in Washington DC (1), Kleiner and Spengler in Boston (2), Lawther (3), Carlyle (4) and Williams (5) in London, the latter three measuring blood carboxyhaemoglobin levels only.

Waldman et al found the CO levels experienced by cyclists to be indistinguishable from those experienced by car drivers on the same routes, the mean levels being in the range 6.8 - 14.0 ppm for four routes of varying traffic volume and building density. Kleiner and Spengler found mean CO levels exposed to cyclists of 8.8 - 17.3 ppm over three different routes. Waldman et al mention a maximum recorded CO level of 80 ppm in Washington, whilst Kleiner and Spengler mention peak CO levels at Boston intersections of 75 - 100 ppm.

The most detailed report of carbon monoxide levels in London traffic is that of Hickman and Hughes (6) who examined the CO levels in eleven car drivers around part of the route in central London including part of the route taken in the present study (the Cromwell Road). They found average CO levels at bumper level in front of the car of 31 - 74 ppm, with levels of 18 - 40 ppm inside the car and peak levels in excess of 200 ppm.

The present results were obtained in a normal situation, "Going to work" during the rush hour, with no particular attempt being made either to avoid heavy traffic areas or to seek them out. The carbon monoxide levels obtained are lower than those given by Hickman and Hughes and comparable to the results of the American cycling studies, suggesting that the CO levels at cyclist height are lower than those at bumper level. These CO levels are well below the 1 hour threshold limit values and present no evidence of excessively high carbon monoxide levels being experienced by cyclists.

In order to make some estimation of the effect that these carbon monoxide levels might have on the cyclist, the carbon monoxide-time plot was converted into equilibrium carboxyhaemoglobin blood level (COHb) using an algorithm developed by Schwar for predicting blood carboxyhaemoglobin levels of maintenance staff in road tunnels (7). The calculated increase was 0.1 - 0.2% COHb. Such an increase over the mean base level of about 1% COHb for non-smokers is not significant when compared to the W.H.O. guideline of 4% COHb, above which people should be protected, and the range of COHb levels found in smokers of 2 - 13% COHb (quoted in Ref. 7).

In the context of the original objective of the study, it seems fair to conclude that cyclists are probably exposed to similar levels of carbon monoxide as car drivers. The consequent carboxyhaemoglobin levels are not so large as to result in any significant adverse effect on the cyclist.

ACKNOWLEDGEMENTS

The author would like to thank David Ball and Jeff Booker of the Air Pollution Group, GLC, David Shillito and David Slater for their advice and assistance in this study.

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5th CLEAN AIR CONGRESS PAPERS AVAILABLE

The National Society for Clean Air have published the Papers from Great Britain presented at the 5th International Clean Air Congress, Buenos Aires, Argentina, 20-25 October 1980. The bound collection of twelve papers is available from: NSCA, 136 North Street, Brighton BN1 1RG, price £9.95, incl. post and packing. Individual papers are 95p (incl. p. & p.). Write for details of titles, or telephone (0273) 26313.

OBITUARY

Dr. G. Nonhebel, MA, DSc, CEng, FRIC, FInstE, MIChemE

Dr. Gordon Nonhebel, who died peacefully at home on 7th December 1980, aged 79, was a former member of the Council of the National Society for Clean Air and had a long and valued association with the Society.

Dr. Nonhebel obtained process, research and design experience during his 18 years at the Billingham works of Imperial Chemical Industries Limited. He then served for 18 years in the Company's chemical engineering section at the Head Office, London.

He was a member of the U.K. Government Committee on Air Pollution 1952-54 (Beaver Committee), and a member of the Clean Air Council from its inception until 1976.

Dr. Nonhebel published many papers on air pollution matters and was the author of the Newnes-Butterworths publication "Gas Purification Processes for Air Pollution Control". Until 1977 he worked as an independent Chemical Engineer and Fuel Technology Consultant.

The funeral service was held at Southampton Crematorium, East Chapel, on Wednesday 10th December. Rear Admiral Sharp attended on behalf of the Society.

ONE DAY TEACH-IN ON THE ENVIRONMENTAL RESPONSIBILITIES OF THE LOCAL AUTHORITY

The One Day Teach-In was organised by the East Midlands Division, in conjunction with the Headquarters of the Society, and held at the Normanton Inn set in some of Nottingham's most attractive countryside. Opening the proceedings, Mr. Bernard Twyford, Deputy Chairman of the Council of the Society, first introduced the Secretary General Designate, Air Commodore John Langston CBE. Turning to the subject matter of the Seminar, Mr. Twyford said that the Society was in the process of looking at its aims and its title with a view to covering the whole field of the protection of the environment, and also to reconsider the Society's role in the light of the demise of the Clean Air Council. It was therefore very appropriate to have so many disciplines brought together for the seminar.

Opening speaker was Mr. J.O.L. Brass, Director of Planning for the City of Derby, who spoke on the 'Wider Aspects of the Responsibilities of the Local Authority' and ably set the scene for the day with a broad look at the environment in general, the things that affect the environment, the impact that results, the bodies and people involved, what can be done, and what, in actual fact, is being done. The more traditional aspects of the Society's concern with pollution and the environment were the subject of the second speaker, Mr. Roy Westerman, Assistant Chief Environmental Health Officer for the City of Nottingham who spoke on 'Responsibilities in the Field of Air Pollution and Noise'. In addition to the factual information on this aspect of the subject, Mr. Westerman outlined some of the areas of difficulty which arise in enforcing the law on air pollution and noise. Mr. A.Q. Khan, Principal Toxic Waste Officer, Environmental Health Department, South Yorkshire County Council ably expounded the problems of waste disposal by describing the way in which his authority were dealing with the problem. Mr. Westerman had said that air pollution predated man. Mr. Khan said that solid waste began when Eve gave Adam an apple and he threw away the core. Mr. Khan not only gave a great deal of information about the scope and complexity of the wastes which had to be disposed of but also indicated the many ways in which people like himself were now acting as advisers to industrialists and waste producers generally.

After lunch the theme was taken up by Mr. T.D.A. Tricker, Assistant Divisional Operations Controller, Severn Trent Water Authority, who spoke about Sewage Disposal and, like Mr. Khan, brought out the variety of sources and the problems of treatment, touching on the matter of odour and also sludge disposal. Mr. Brass had earlier asked, in light hearted vein, what, had the internal combustion engine never been invented, should we do with all the horse manure in the streets? Discussing the production of methane from sewage sludge, Mr. Tricker said that each horse would have been a source of three cubic feet per day!

Rounding off the day, Mr. T. Wyke, Parks Manager, City of Nottingham, spoke on Open Spaces, Parks and Landscaping. Mr. Wyke said he had once heard open spaces defined as SLOAP - space left over after planning - but his preferred definition was all that area which was not built upon. Mr. Wyke described our heritage of parks and open spaces and cited the situation in the City of Nottingham to show how local authorities preserved what was worthy of retention and how open spaces are still being developed and laid out.

In the course of questions and discussion the relationship between all forms of pollution was brought out - the potential for what is emitted to the atmosphere affecting water; or being washed into drains and and affecting sewage treatment; the possible emissions to atmosphere from waste deposition; the problems of odour; the need for vigilance to ensure that current government pronouncements on speeding up the planning decision processes do not result in the conditions under which people live being invaded by industrial activities in the locality. Parks and open spaces also have their part, as Mr. Wyke reminded us, in that vegetation in the presence of sunlight absorbs carbon dioxide from the air and gives out oxygen.

We know that in the areas of the environment which have not previously been our immediate concern there are already specialist bodies concerned with the particular functions but Mr. Khan made a telling point when he said that it is easy to become blinded with one's own terms of reference. The outcome of the day's deliberations must, I feel, encourage the Society to extend its frontiers to become a responsible guardian of all matters affecting our environment.

E.F. Raven
Hon. Secretary,
East Midlands Division

POSTER COMPETITION

The Society has launched its National Poster Competition for children in two age groups: 13 - 15 and 16 - 18 years.

The aim of the competition is to get young people to think about the implications of Air Pollution or Noise and use their artistic skills to design a poster which will encourage support for clean air or noise abatement. The competition will complement work done in schools but equally important will give the Society a real idea of what children think about air pollution and noise and of how they visualise these problems. Entrants are being asked to design an A3 size poster, that is 11¾" wide by 16½" long (297 x 420 mm). They may use three colours (black is counted as a colour) on a white ground and words or slogans, if desired, although these are not obligatory. Each design should be on the theme of EITHER Air Pollution OR Noise.

Entrants should be resident in the UK, and receiving full time education.
Closing date for entries is 24 July 1981.

PRIZES
There will be a first prize in each age group of £200; second prize in each age group of £100; 2 runners-up prizes in each age group of £50. In addition there will be an award

of £100 for the school(s) of the first prizewinners in each age group. Total value of the prizes is £1000.

A panel of 5 judges will assess the entries on the basis of originality, design skill and how well they reflect concern for clean air or noise abatement. Prizewinners will be notified by post the week beginning 6 September 1981 and the results will be announced to the Press. There will be a prize-giving ceremony on Tuesday, 6 October, at 12 noon at the 48th Clean Air Conference (Brighton Conference Centre, 5-8 October 1981). Some of the designs submitted for the competition will be displayed at the Clean Air Conference and Exhibition.

The Society has printed thousands of notices advertising the Competition which Education Authorities are kindly despatching with normal mailing to Upper Schools. Information about the Competition has also been sent to national and local Press and Media, and the response so far has been very encouraging. A list of prizewinners will be published in a later issue of *Clean Air.*

NORTH WEST DIVISION ONE DAY SYMPOSIUM
AIR POLLUTION CONTROL – EEC ? UK – CONFLICT OR CO-OPERATION

2nd June 1981 (10.00 – 16.00). Venue: Lecture Theatre, N.W. Region Gas HQ, Welman House, Moss Lane, ALTRINCHAM, Cheshire

Scope: The Symposium is intended for technical officers of Local Authorities, industries and other concerned bodies, and Elected Members of Local Authorities, particularly those with Environmental responsibilities. Attendance is NOT limited to members of the Society.

Subjects for discussion and Speakers:

1. An introduction to the relationship between EC and UK controls. Legal implications of join agreement.
   Mr. Tom Normanton, T.D., M.P., M.E.P.
2. EC Standards and their effect on Member States as a whole. Current proposals and future thinking.
   Mr. A.M. Price, Commission of the European Communities, Environment and Consumer Protection Service.
3. Policy on standards for UK controls and relationships with EC standards.
   Mr. C.P. Evans, Department of the Environment
4. Practical implications of the UK and EC standards for pollution controls.
   Mr. G. Barrett, National Society for Clean Air

Fee for attendance (payable in advance) which includes lunch and other refreshments, is £8.00.

All enquiries to: **Mr. J.B. Douglas,** Hon. Secretary, North West Division, NSCA, c/o Environmental Health Department, Wesley House, Corporation Street, St. Helens, WA10 1LF. Tel: St. Helens 24061, ext 3175 or 3196.

NSCA VIEWS

PHURNACITE PLANT AT ABERCWMBOI, SOUTH WALES

Text of the submission made by the National Society for Clean Air to the Rt. Hon. David Howell, MP, Secretary of State for Energy.

Sir,

This works is the largest producing solid smokeless fuel in the United Kingdom. It is operated by National Smokeless Fuels Ltd. and makes some 800,000 tons of Phurnacite briquettes per year by means of the "Disticoke" process using six batteries of 40 ovens each. It is estimated that the Phurnacite produced comprises some 15% of the total United Kingdom solid smokeless fuel market. Some 900 people are employed at the works and it is understood that the raw coal used in the process comes from four mines in the immediate vicinity of the works and these employ a further 4,000 men.

Since the 1950s there have been constant complaints from a long suffering public about grit and dust fallout and emissions of smoke and smell from the works. Although some plant modifications have been made, as the works have got older, and the traditional raw materials have ceased to be available, the emission problems have increased. The stage has now been reached when the emissions will have to be reduced substantially to make them reasonably acceptable to the local population. This would mean replacing at least part of the existing works, which have been in operation since 1942, with a new plant using a new process. For this, it is understood that the "Ancit" process is favoured. The cost involved in replacing the two oldest batteries (the proposal which was previously put to the Government by the National Coal Board) is about £36 million.

However the complete answer would be for the "Ancit" process to replace entirely the "Disticoke" process. If this could be achieved over a period of time, albeit years, the gradual improvement would be welcomed by everyone so adversely affected at the present time.

If the works were to be closed down, this would have the effect of abating the pollution on the one hand, but would also result in the loss of some 5,000 jobs in an area which is already subject to high unemployment, and the loss of some 800,000 tons a year of solid smokeless fuel. The loss could have a serious and adverse effect on smoke control areas throughout the country. To replace this fuel, it is understood that it would be necessary to import solid smokeless fuel at an estimated cost of some £60 million per year.

Although the cost of replacement of the plant will be considerable, if the plant is closed down and not replaced, the impact on unemployment and clean air would be much more far reaching, and in the long run, much more costly. We are aware of the very thorough case which has already been presented to you by the National Coal Board on behalf of National Smokeless Fuels, and by the National Union of Mineworkers. Nevertheless, it is really unacceptable that the residents near the Abercwmboi plant should be expected to continue to endure such high levels of pollution. The Council of the Society therefore urge the Government to reconsider their decision and to make available the necessary money for the rebuilding of the Phurnacite plant at Abercwmboi embodying a new process which will substantially reduce the pollution in that part of South Wales.

Although this submission represents the views of this Society the facts presented have been verified with the National Coal Board. A copy is being sent to the Secretary of State for Wales.

John Moore, M.P., Parliamentary Under Secretary of State, Department of Energy, replied to the Society as follows:

"Thank you for your letter of 26 February to the Secretary of State about the Phurnacite Plant at Abercwmboi, South Wales. I have been asked to reply.

I am afraid there is very little I can add to what you already know. The Government have decided there are no special factors which would justify exceptional treatment of this project. Further, the National Coal Board have confirmed that the plant at Abercwmboi would continue to be a loss maker.

National Smokeless Fuels Limited are doing all they can to improve the position environmentally. They are constantly in touch with the Alkali Inspectorate and have embarked on a £4 million programme of remedial measures and improvements. Further progress can be expected following the rebuilding of some of the existing batteries."

REPORT OF THE ENQUIRY INTO LORRIES, PEOPLE AND THE ENVIRONMENT (THE ARMITAGE REPORT)

Part of the submission, on Legislative Control of Smoke Emission, made by the National Society for Clean Air to the Rt. Hon. Norman Fowler, MP, Minister of Transport.

"In its written submission to Sir Arthur Armitage for the subject enquiry, this Society recommended changes in type-testing. It noted that two curves were in use, the British Standard curve BS AU 141a and the EEC curve, which are slightly different. The National Society considered that there should be one curve only and that all vehicles within the EEC should be manufactured to this standard. Additionally it expressed the opinion that the EEC Directive was insufficiently stringent particularly as the production control test is less exacting than that described by the type regulations. It allowed no margin for slight engine deterioration or for "off colour" operation of the fuel injection equipment. Thus engines set at the maximum allowable smoke emission and "rated" under this condition, leave the factory in a visibly smoking condition which is more likely to get worse than get better. Any slight deterioration in the functioning of the fuel injection equipment then had the effect of causing dark or black smoke. Smoking by all engines set as described could be practically eliminated by modifying the Regulations to provide a small margin, in the manner practised for many years by London Transport on its huge fleet of buses. The Society therefore recommended that the United Kingdom Government should seek a revision of the EEC Directive to implement this more severe limit.

While the Society welcomes recommendations 42-44 in the subject report, it considers that reductions in the emissions of pollutants from diesel powered vehicles are in practice more effectively achieved through the basic control of engine design (through adequate type-testing) than from checking smoke emissions from vehicles on the road.

The Society is, therefore, disturbed to discover that the subject report makes no recommendation for setting more severe requirements for the "type-testing" of diesel engines. It urges the Government to introduce effective measures to this end at the earliest opportunity."

The Department of Transport replied to the Society's submission as follows:

"There are two factors affecting the number of vehicles emitting excessive smoke. These are, as you quite rightly say, the standards applied on type-approval of new vehicles and the degree of maintenance they receive once in service. Observations carried out throughout the country, by the Department have consistently shown that about 14% of all heavy goods vehicles are judged to be smoking excessively on the road, however the figure is 6% for newer vehicles up to just over one year old. This indicates that vehicles are deteriorating in service and we feel there is a need to better control vehicles in use to maintain the original approval standard. Badly smoking vehicles will smoke whatever the type approval standard.

I think you are right in suggesting there could be scope for tightening the approval limits and this is certainly something which will be considered, but it is felt that whatever the limits applied to new vehicles they should be maintained in use.

As regards your other point about the two curves used in BS AU141a and the EC Directive 72/306, in fact the two curves are the same but are quoted at different reference atmospheric conditions. A difference in the actual test result could be apparent however, because the Directive only allows testing within a narrow band of atmospheric conditions whereas BS AU141a gives correction factors for smoke allowing tests to be carried out over a wide variation of conditions. I agree it would be simpler if the two requirements were the same but in practice it makes little difference.

I would like to thank you for your views on the checking of smoke emissions and assure you these will be taken into account in the consideration of the Armitage Report."

NSCA CONCERN OVER FUTURE OF ALKALI INSPECTORATE

A paper of indeterminate status entitled "Health and Safety Executive — Future Organisation" which has been lodged in the House of Commons Library proposes changes for the organisation of the Alkali Inspectorate within HSE both at central and area level.

Proposals include setting up an overall HSE Inspectorate under an Inspector General. The various reporting inspectorates would have a common grading structure (to facilitate across-the-board recruitment, etc.) although they would continue as functional groups dealing with specific types of work. Industrial pollution would continue to be handled by a separate group of inspectors, with the Alkali Inspectors to be known in future as "Industrial Pollution Inspectors" (IPIs). The Chief Industrial Pollution Inspector would "respond" to the new HSE post of Inspector General, along with other senior officers.

Regionally, HSE would have a basic field organisation on the lines of the present Factory Inspectorate areas, each area with an Area Director in charge. The Area Director would be responsible for co-ordinating all HSE field activities through his area. While Industrial Pollution Inspectors would respond to the Chief Inspector at HQ on the performance of their primary function, in order to integrate their work more closely with the rest of HSE consolidation of Divisional Inspectors within the HSE area organisation is proposed. The document suggests that regional IPI organisation should be as far as possible on the same geographical basis as the main HSE area organisation and that Industrial Pollution Inspectors should be located in the HSE area offices. It is also proposed that IPIs should respond to the Area Director on major issues arising in their work to ensure co-ordination with other HSE functions in the same workplace. IPIs would be regarded as part of the Field Consultant Group serving their area, making their experience available in "responding" to the Head of the FCG. The proportion of time spent on "area" work outside the Inspectorate's primary function would be settled in general between the Inspector General and the Chief Industrial Pollution Inspector and in detail by consultation at area level. Support resources of HSE would be available, on request, to IPIs.

Reorganisation on these lines, within HSE, would run completely counter to the proposals made in the Fifth Report of the Royal Commission on Environmental Pollution which, in Chapter VIII, gave powerful reasons for a unified pollution inspectorate with Department of Environment (DOE) control.

HM ACAI have been in the HSE organisation (Department of Employment) as an autonomous body, since 1975. While the Health & Safety Commission is formally responsible to the Secretary of State, Department of Environment, on all pollution matters, many bodies, including the NSCA, welcomed the Flowers Report recommendation that a new unified Pollution Inspectorate should be formed, incorporating the Alkali Inspectorate, and transferred to the complete control of DOE. The Secretary of State for Employment gave an assurance "that the Alkali Inspectorate would not be integrated into HSE in such a way that it would be difficult to disentangle later if other arrangements were decided to be preferable in the light of the Royal Commission's recommendations". (Health and Safety, Industrial Air Pollution, Report for 1975. Pub. HMSO, 1977.)

The Department of the Environment invited comments on HMPI in a consultative paper issued in 1976. So far the Government and the Department have made no response to either the Fifth Commission proposals or the comments made by the various interested bodies consulted in 1976. The Society therefore sent the following letter to the Rt. Hon. Michael Heseltine, MP, Secretary of State, Department of the Environment.

Sir,

A Unified Pollution Inspectorate (HMPI)
and the Department of the Environment

We have received a copy of a paper entitled "Health and Safety Executive – Future Organisation" which may be seen in the library of the House of Commons. While we are not altogether clear about the status of this paper which we understand expresses a personal view of the Director General of the Health and Safety Executive, we are concerned that its connection with the House should not enhance the value which some might ascribe to it by virtue of that connection.

As we wrote to the Secretary of State for the Environment in answer to his request for comments, this Society fully supports the recommendations of the 5th Report of the Royal Commission on Environmental Pollution for the future of HM Alkali and Clean Air Inspectorate including, importantly, its re-incorporation within the Department of the Environment (HMPI). We note that the Health and Safety Executive Paper makes no reference to the recommendations put forward in Chapter IX of the 5th Report of the Royal Commission whilst describing a restructuring of its organisation which would be directly at variance with them.

As the Health and Safety Executive paper has become a topic both of concern and speculation amongst our members, we would be most grateful to know your current position on the recommendations for HMPI contained in the 5th Report of the Royal Commission on Environmental Pollution.

We have now received a reply from the Department of the Environment:

As you know the Government has still to respond to the recommendations of the Fifth Report of the Royal Commission on Environmental Pollution. No final decision has yet been taken on the future of the Alkali Inspectorate.

When the Health and Safety Executive was set up, Ministers asked the Commission to ensure that no changes were made to the organisation of the Alkali Inspectorate which could prejudice any alteration of the present arrangements that might be decided upon in the light of the Royal Commission's report. The proposals for the reorganisation of HSE are, as you say, a personal view put to the Management Board by the Director General. Its provisions for the Alkali Inspectorate could not be implemented without the agreement of the Department of the Environment."

Although this reply makes it clear that DOE will be involved in the final decision on the future of the Alkali Inspectorate, it does not answer clearly and fully, the Society's concern and the question put to the Secretary of State.

INDUSTRIAL AIR POLLUTION 1979

The annual report of HM Alkali and Clean Air Inspectorate for 1979 has just been published. The report makes it clear that industrial recession has affected the standard of control which HM ACAI has been able to apply during the year under review. The Chief Inspector, Mr. Jim Beighton, says that care and concern for the environment are now having to compete more with such factors as inflation, employment and difficult trading conditions. During 1979 Inspectors found reduced industrial activity and relatively little evidence of new projects. Complaints during the year fell back from the peak of 1978 to a level typical of earlier years. The report says the picture was probably influenced by reduced industrial activity and possibly by preoccupation among members of the public with other problems in difficult economic times. The report makes it clear that in some cases industry found it very hard to finance major improvements in pollution control and Mr. Beighton says that in these circumstances it is more than ever important that best practicable maintenance and use should be achieved on control means which are installed and available.

463 works were investigated in 1979, 405 of which were registered under the Alkali Act. The frequency of complaints was similar in pattern to previous years, with complaints being most numerous against mineral works, electricity works, iron and steel works, petroleum works and others in that order. Complaints investigated at the request of local authorities, against non-registrable works, were mostly concerned with processes involving organic chemicals or metals. Again, the overall level of complaint was lower than for 1978. Reported infractions in 1979 were 84, compared to 100 in 1978. 9 cases were actually initiated for legal action in 1979, and in those cases which were heard in court in 1979, fines ranged from £20 to about £400, costs being awarded in all cases except one.

It is always difficult to review the Chief Alkali Inspector's reports as most of the events recorded were dealt with up to two years ago and, while some are ongoing problems (to the Inspectorate's regret), many colourful events described are past history. The report for 1979 continues the tradition of naming companies and their sites only sparsely but some sagas of investigation will be recognised by Environmental Health Officers and others who were involved in particular incidents.

As might be expected, recession hit the British Steel Corporation particularly ~~hard~~ during the year under review and difficulties were reported in meeting the requirements of Best Practicable Means on certain plant at a variety of BSC sites. These problems were partially resolved by BSC's closure plans. However, problems remained on some steel plant in South Wales and further discussions were held to resolve technical issues. The availability of finance to implement schemes to overcome public complaint remains in doubt. The climate of financial and trading hardship and of uncertainty regarding the Corporation's future plans and policy were major factors in this. One success story of the steel industry, and of the Sheffield area in particular, was the control of emissions from electric arc furnaces. Installations of primary and secondary extraction systems ducted to arrestment plant give continuous benefit to the area around various works.

Setbacks in control were reported to have outweighed progress in the coke industry. This was particularly true of some BSC plant where uncertainties about the future delayed decision-making and kept old batteries in operation beyond the time when acceptable control could be achieved. Similarly, continued operation of the National Smokeless Fuel's phurnacite plant at Abercwmboi was again reported as presenting severe problems and the principal conclusions of the investigating team which reported in 1979 are set out in this report. The Alkali Inspectorate agreed to a £4 million programme which had much in common with an earlier assessment made by the Inspectorate. This programme has been put in hand and regular process review meetings have taken place between the Inspectors concerned and the NSF personnel. However, the report says that the company's apparent intention of keeping certain Disticoke batteries operating for some years yet presents considerable pollution problems and the company had been advised that a more modern process should be sought. As the National Society for Clean Air have stated in their submission to the Secretary of State for Energy, the alternative to the implementation of this £4 million programme is to progressively replace the Disticoke batteries by the Ancit process. As a reduction of total emissions in the order of 90% would be needed to avoid the present very justified level of complaint and as this cannot be achieved by modifications to the existing process, in the long term the only real solution lies in replacement of existing plant by the Ancit process.

The Central Electricity Generating Board continued to overhaul their electrostatic precipitator installations, at a reported cost so far of £12 million. The Alkali Inspectorate report improvement in conditions as a result of this overhaul, with the exception of substandard performance of electrical precipitators at Ratcliffe Power Station.

The Inspectorate's Task Force on Dispersion of Emissions spent the year mainly on the study of two items, firstly concerning the processes involved when gas or vapour is ejected from pressurised vessels via relief systems such as bursting discs, and secondly on the phenomenon of droplet emissions from chimneys carrying water-saturated gases. Problems arising from emissions from bursting discs, relief valve operations, failure or safety interlocks and general leakage are mentioned at several places in the report relating to hydrochloric acid, chlorine, bromine, ammonia, petroleum and, in Scotland, nitric acid works. In several cases, substantial losses of material resulted, leading in one case to severe discomfort in employees at a nearby works and in public complaints at another. The Task Force aims to find means of assessing pollution problems as an aid to developing Best Practicable Means in this context.

As readers of the report will no doubt have noticed in 1978, the appendices on Best Practicable Means for various classes of process are now published separately in a new series of Notes. Three sets of Notes were published during 1979 and a wide range is in the course of preparation. These Notes can be obtained from HSE General Information Point, Baynard House, 1 Chepstow Place, London W2 4TF, telephone 01-229 3456.

The Inspectorate have continued to liaise with local authorities, trade associations (notably EPEMA) and other bodies including, of course, the National Society for Clean Air. Representatives attended the Annual National Conferences of the Society and of the Environmental Health Officers' Association, and locally, District Alkali Inspectors have continued to be associated with the work at divisional level of the National Society for Clean Air.

The Report, **Health and Safety Industrial Air Pollution**, published HMSO 1981, costs £3 net and is available from HMSO and Government bookshops.

NOISE CONTROL IN WORCESTER

Worcester City Council produces an excellent annual report on the environmental health of the City.* The section on Noise shows that Worcester is fully involved in all the various aspects of noise control which fall within the remit of a local authority, and, as with all its environmental health work, Worcester Environmental Health Department's policy is to give top priority to noise complaints and to deal with these without delay. Mr. J. Hartley, City Environmental Health Officer, reported a decrease in the number of complaints received about noise, from 72 in 1978 to 48 in the year under review (1979). After full investigation, only 28 of those complaints were substantiated and were dealt with by informal action (either verbally or by informal notice) with formal notice being necessary in only one case. The formal notice served related to noise nuisance caused by the testing of chain saws and agricultural machinery in the open at the rear of a retail shop sited within a particularly sensitive residential area. The notice resulted in the construction of a sound-proofed test bay.

A recent BBC2 television documentary highlighted the problems caused by noisy and inconsiderate neighbours and Worcester has its share of such troubles. The City Solicitor took legal action on two occasions on behalf of householders exercising their rights under the local byelaws in respect of nuisance caused by neighbours' barking dogs. The particular byelaw provides that "no person shall keep within any house, building or premises any noisy animal which shall be or cause a serious nuisance to residents in the neighbourhood". Although it is qualified by a requirement that notice must be served on the owner of the offending animal, alleging nuisance and signed by not less than three affected householders, one of the cases was successful and the dog owner was convicted and fined. The other was dismissed for lack of evidence of "serious" nuisance.

Insufficient or poorly documented evidence is often a handicap to local authorities who might wish to act on behalf of residents affected by barking dogs or other unneighbourly noise nuisances. When such complaints are made to the National Society for Clean Air by individuals, the advice given is similar to that offered on the BBC television programme, namely to keep a fair and objective record of the nuisance in diary form. A note should be made by the complainant of the date, time and duration of the nuisance. (If it is an air pollution nuisance, the Society also recommends that weather conditions, wind direction and visual observations be noted as well.) Although assessments of the degree of nuisance are necessarily subjective, it helps when presenting this evidence in court to have some indication of whether the nuisance was severe or not so that the record can be shown to be as objective as possible. Another difficulty is to persuade neighbours who may be equally affected by, e.g. a barking dog, to keep their own records or indeed make any complaint about the matter to the local authority and thus substantiate the original complainant's case.

A seasonal noise nuisance mentioned in the Worcester Report was caused by "mechanical" percussion bird-scaring devices used by farmers to protect their crops. Birds are awake and ready to feed before most people are stirring and a pre-dawn barrage of heavy artillery bird-scaring devices can shatter the nerves of anybody trying to sleep within a quarter of a mile.

The Worcester Environmental Health Department pay particular attention to planning in respect of noise control from new industrial development and extensions to existing factory premises. Their established policies were tested on two occasions by applicants appealing to the Secretary of State against conditions contained within their approvals. These conditions were imposed to ensure that, as far as possible, there would be no noise intrusion or nuisance to adjoining premises, or no appreciable increase in the ambient noise level existing in the area.

Mr. R. Key, Senior Environmental Health Officer (Pollution Control) points out that these appeals highlight the importance that should be attached to noise and planning. Many of the noise problems at present being dealt with by local authorities are associated with non-conforming users, e.g. industrial premises sited within residential areas, and resulting from the absence of effective controls in the past. Worcester City Council holds that all planning applications should be examined by the Environmental Health Department as it is often possible to anticipate that noise problems may be caused by the nature of the proposed operations, or its location in relation to other premises. The Council's membership of the Midlands Joint Advisory Council for Clean Air and Noise Control proved extremely useful in the preparation of submissions in respect of appeals against noise conditions imposed in planning consent. The topic of planning and noise had been the subject of considerable technical discussion by the Joint Advisory Council and the concensus view of the various specialist officers in the field of noise control supported the policy adopted by the Worcester City Council.

The cost of not having regard, at the design stage, to noise levels set on planning approvals was illustrated by a printing company with works situated in close proximity to residential accommodation.

The company concerned had previously received planning approval for the installation of a paper waste extraction cyclone which was conditional upon a noise level not exceeding 50dBA at site boundary being achieved. However, when the plant was installed and commissioned some months later, complaints were immediately received and upon investigation noise levels in excess of 60dBA were monitored at the site boundary of the works.

In view of the lengthy and cumbersome procedures involved in the enforcement of planning conditions and in view of the urgency of the matter, a notice under Section 58 of the Control of Pollution Act 1974 was served requiring abatement of the nuisance. Certain modification works were subsequently carried out which produced some attenuation of the noise level, but by that time it had become apparent that the whole extraction system was unable to cope with the volume and type of waste paper and dust being produced in the premises. The problem became more acute when emissions of dust began to cause additional nuisance to the surrounding area.

Eventually, after considerable pressure, a completely new extraction plant was installed but this in turn caused initial problems until additional silencers and dust arrestors were fitted.

Whilst the requirements of the notice under the Control of Pollution Act were finally satisfied at some considerable cost, the residents remained far from happy about the visual impact of the plant upon the area.

* **The Environmental Health of Worcester, 1979 Annual Report on the Environmental Health of the City,** by J. Hartley.

NOISE IN THE NETHERLANDS

Report by **Mr. J. Kuiper,** Nederlandse Stichting Geluidhinder, AJ Delft

In future the Dutch government will be fighting noise with the help of a comprehensive law which applies not only to noise pollution caused by road, rail and air traffic, but also to that caused by shipping, industry, hobby and domestic appliances, building and agricultural machinery as well as firing ranges, aerodromes and other sources of noise.

Road traffic is however the biggest "villain" - above all the motor vehicle, so the motorist was the first to be penalised. In the case of environmental pollution the principle of responsibility: "The offender bears the costs for the measures required by law", (polluter pays principle) applies in the Netherlands. At the beginning of June 1980, Parliament approved a purpose-linked fuel tax increase of about 0.5 Cent per litre, and in 1982 a non-recurring tax for each vehicle will be introduced, based on the noise characteristics of the various vehicle types.

With effect also from 1982, industry will have to pay the reconstruction costs to dwellings for which it is responsible — at least that is the intention of the Dutch Minister for Public Health and Environment, based on an annually improving multi-year plan for noise abatement.

Noise restriction is of prime importance in the road traffic sector as approximately half (48%) of the Dutch population perceive road noise as a nuisance; 20 percent regard it as serious. The moped is held to be the worst offender followed by the lorry, motorcycle, private car, delivery truck and bus in that order. In the case of about 6 percent of all dwelling-houses, the noise level at the front of the buildings is in excess of 65 dB(A) due to road traffic. 55 dB(A) is however the preferred limit. An attempt was made to evaluate road traffic noise from an economic point of view, but the documentation and calculation methods available for this are not yet sufficient.

NOISE ZONES

The first multi-year plan covers the period 1980-1984 and contains a large number of measures. In relation to road traffic there are basically four alternatives available:—

- the reduction of motor vehicle emission limits;
- the establishment of noise zones (as acoustic research areas) along roads;
- the erection of noise protection barriers between the source of the noise and the "receiver" (dwelling-house);
- sound insulation measures for houses and buildings.

Noise zones are an innovation for the Netherlands, not only along roads but also along railway lines where possible. The size of these zones for roads is specified in the Noise Abatement Act. The zones count as a study area within which the consequences of noise pollution are to be given special consideration; it is therefore not a question of zones where building is prohibited.

Its width relates to the theoretic area affected by the road if the noise is not muffled anywhere. The general limit for the noise level, measured at the front of the houses in the zones, is 55 dB(A) but exceptions up to 75 dB(A) are possible. In 1981 the Ministry of Public Health and Environment intends to prescribe by law the establishment of these zones in the planning of new road lines and industrial sites. In 1982 and 1983 they are to be introduced for existing sites and those projected. According to the multi-year plan, with effect from 1984 reconstruction measures to minimize noise must be tackled.

TRAFFIC CONTROL MEASURES

However, the introduction of noise zones applies only above certain traffic loads. It would therefore be important to reduce the number of motor vehicles in residential areas, if these are to be spared from the ramifications of screening devices. So, apart from the promotion of public transport and bicycle traffic it is also recommended that the traffic flow be better organised, i.e. by switching traffic from roads in residential areas to main roads.

Traffic control measures such as the coordination of traffic lights, one-way traffic, bus lane, right of way regulations and speed limits are also listed in the multi-year plan as alternatives for reducing noise. But experts do point out that even given the combination of these latter measures, no greater noise reduction than a maximum of 5 dB(A) can be achieved.

In the town of Groningen, for example, the introduction of the traffic cell system with emphasis on public transport and bicycle traffic in the town centre produced a drop in the noise level of only 3 dB(A) on average. In comparison with this, along the ring road which in the new concept has to cope with an additional 16 percent motor traffic, a maximum increase of 4 dB(A) was measured. The overall costs for the noise insulation measures in dwelling-houses have been reduced by 18 percent by the introduction of the traffic plan.

COST IN MILLIARDS

The restriction of the effects of noise means considerable financial expenditure for the authorities. The reconstruction costs for dwellings and other buildings where noise is particularly undesirable were estimated at 2.1 milliard Guilders for the whole country for an initial phase of 10 years (based on 1976 prices). More than half this amount, 1.25 milliard Guilders, is to be debited to road traffic. The reconstruction costs attributable to industrial noise amount to Fls. 400 million, and those caused by rail traffic Fls. 100 million. As yet there is no final estimate available for air traffic; initial estimates indicate the order of magnitude of Fls. 160 to 600 million (price basis 1973) depending on the reconstruction variants. Subsidies for insulating houses are included in these sums where the specified maximum value cannot be achieved in the noise zones. As a standard for rooms where noise is particularly undesirable behind closed windows 35 dB(A) is valid for planned housing and up to 45 dB(A) for existing housing.

As already mentioned, the offender bears the costs of the measures required. For 1981 the expenditure is estimated at 48 million Guilders, but the purpose-linked receipts from the traffic sector only amount to 38 million Guilders. For 1982 these sums amount to 119 million and 99 million Guilders respectively (including Fls. 10 million as the contribution from industry). For the present the State must therefore grant advances.

EMISSION LIMITATION - AND STUDIES

A limitation on the emission at source is preferable to indirect measures. In the official type acceptance test in the Netherlands a limit of 73 dB(A) is at present applicable to mopeds in the travel test (over 7 m) and 96 dB(A) in the stationary test (over 0.5 m). 102 dB(A) (over 0.5 m) is acceptable as a maximum for the road test! These values will be made more stringent in the coming years, i.e. for the road test, up to 98 dB(A). In a number of studies, investigations will be conducted into how the noise from motor vehicles can be further reduced. For buses alone this will be dealt with in six part studies.

A sum of Fls. 21.5 million is estimated for the current studies in 1980 - 1982; the cost of work involved in public information and instruction runs at Fls. 10 million. There is a special institute for noise abatement - the Netherlands Noise Abatement Society (NSG) which has been active for 10 years. It advises private citizens, businesses, organisations and authorities as well as organizing public information campaigns and courses. A competition was recently run by the NSG for both amateurs and professionals with the object of designing noise protection walls and embankments. The 250 entries show that there are other alternatives to grey screens, concrete walls and earth embankments as straight as an arrow.

NOT ALL THE PROBLEMS ARE SOLVED

In the execution of the Act, which was approved by the Sovereign as long ago as the 16.2.1979, various duties are assigned to the municipalities and provinces. At the beginning of next year they must submit a multi-year plan for 1982 - 1985. The central authority want to use these plans as a basis for their new multi-year plan. The government is making a financial contribution of 15 and 20 million Guilders for 1981 and 1982 respectively for the setting up of local and regional offices.

The new Act enables the individual measures to be better coordinated and facilitates coordination of the work at State, regional and local levels. However, it does not solve all the problems. Expert critics complain that the Act does not address itself to the problem of human behaviour (at home, on the street, on the beach etc.). Unnecessarily loud use of cars, mopeds and motor-cycles, screaming music from transistor radios and cassette recorders cannot be fought with this law. A poll shows that it is precisely this type of noise which is regarded as particularly annoying. It is however a difficult matter to exert influence on human behaviour - for 4 years the NSG has been trying to bring about a noise awareness - as experience with traffic safety demonstrates.

The automobile club ANWB is against the fuel tariff as this would in no way lead to a reduction of noise. On the other hand, according to the ANWB, under certain circumstances a purchase tax could well be a stimulus for the production and acquisition of quieter vehicles. In addition, the ANWB regards as a shortcoming the fact that in the existing multi-year plan no provision has been made for holiday resorts as "areas where noise is particularly undesirable".

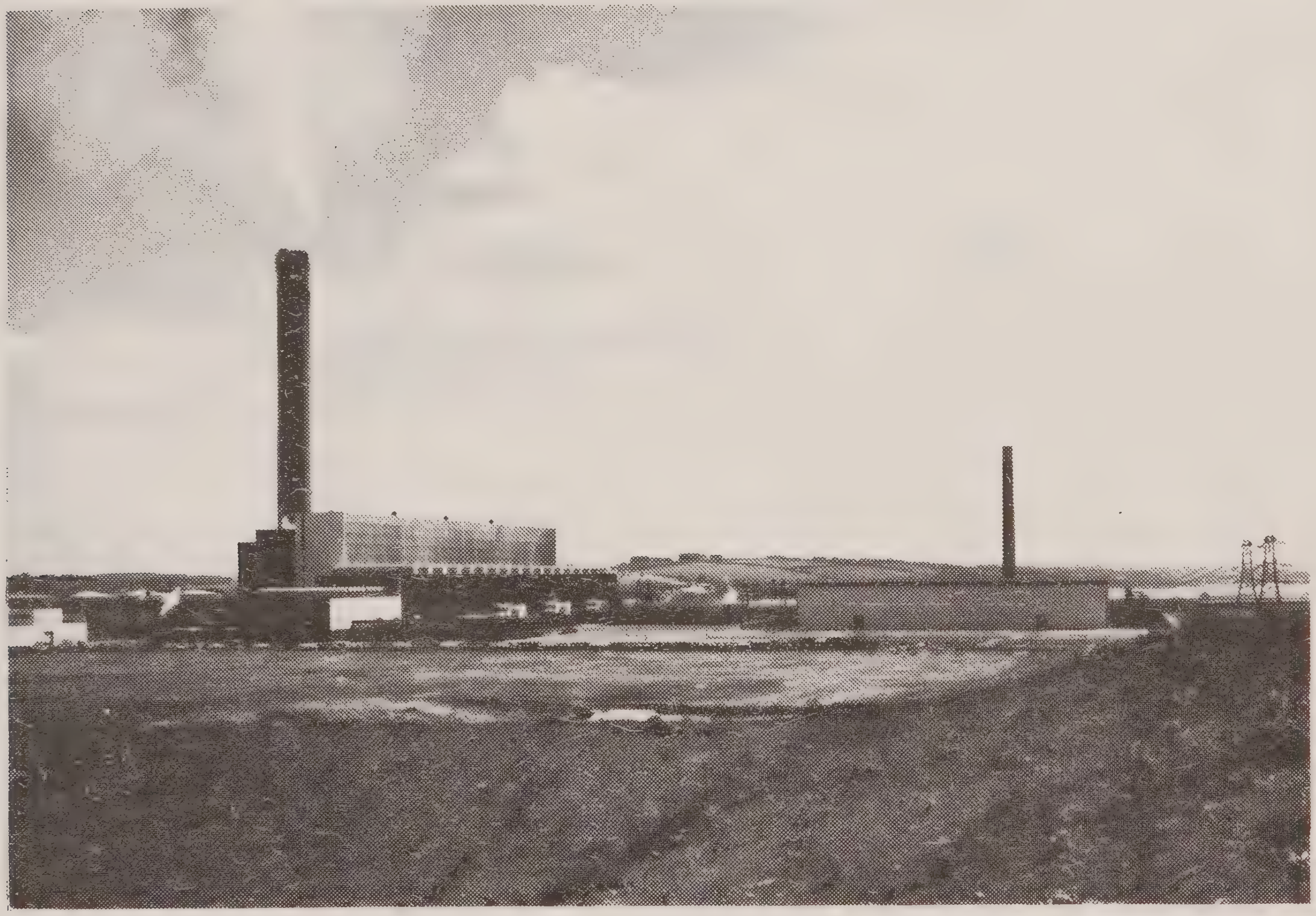
The statutory Central Council for Environmental Health, which advises the Minister, advocates as a priority the establishment of 'quiet' areas as well as an improvement in the abatement of aircraft noise. The Council finds it "astonishing" that the standards for air traffic noise are less strict than those for road traffic.

In spite of all the criticism, the Netherlands' Noise Abatement Act does offer a better basis for fighting noise pollution than the scrappy regulations which existed hitherto and which stemmed in part from as far back as the beginning of this century.

ACKNOWLEDGEMENTS

This report, by Mr. J. Kuiper, Nederlandse Stichting Geluidhinder, AJ Delft, was originally published (in German) in the Informationsbulletin 2/1980, of the International Associaation Against Noise. Translation into English by Wessex Translations.

Caring for the environment



The Central Electricity Generating Board has received more than 40 Commendations and Awards for environmental schemes at power stations, substations and associated nature trails and field study centres in England and Wales.
They include the Arnold Marsh Clean Air Award, two Prince of Wales Awards, four from the Business and Industry Panel for the Environment, six RICS/Times Conservation Awards and nine Wales in Bloom Awards.

Central Electricity Generating Board

Reader Enquiry Service No. 903

RECENT PROGRESS IN SMOKE CONTROL – A REVIEW

by **Jane Dunmore**

Now that the Planning and Land Act has introduced new procedures for smoke control, so that local authorities may set their own programmes without reference to the Department of the Environment except (and very importantly) for approval of the necessary financial expenditure, it seems appropriate to review smoke control progress and try to determine current trends.

As at 31st December 1980, over 8 million premises and 2 million acres are covered by some 5½ thousand smoke control orders in operation in the UK. In 1980, 219 local authorities responded to the NSCA circular asking for details of progress in smoke control. Of these 219, 41 local authorities have completed their smoke control programmes, with 9 authorities achieving completion in 1979. While such statistics may give a broad indication of progress, it should be recognised that some local authorities set themselves big targets for smoke control, in terms of acreage and premises, and thus have to expend a great deal of money and time in achieving completion of the programme. Other authorities, restricting themselves to a smaller programme, complete it more easily.

Comparison of the smoke control "Programmes and Progress" tables published in the NSCA Members' Handbook shows some interesting trends. The target dates for completion of smoke control have been moved back year by year in many areas and 70 local authorities are without a target date for completion. The 1980 returns show that 23 local authorities have suspended their smoke control programmes compared with 6 in 1975 and 11 in 1978 and 1979. Taken together with the setback in target dates for completion in other areas, this indicates a considerable slowdown in progress overall. DOE figures confirm this trend with the 1980 Digest of Environmental Pollution Statistics* showing a downward trend in DOE grants for smoke control expenditure for the UK as a whole, from £3 million in 1972/3 to £1,600,000 per year from 1978 onwards. In Wales, where no smoke control orders have been made since 1978, there was of course no grant made. In Ireland, authorities received the highest ever total grant at £230,000 in 1979/80, whilst Scottish authorities received half of their 1976/77 peak of £200,000. The trend in grant to English local authorities has been steadily downwards with £2,600,000 coming from DOE in 1973/74 and £1,400,000 in 1979/80. Bearing in mind the inflation during that period and the increase in cost limits allowed by DOE, this indicates a very marked downward trend. This is confirmed by trends in the number of orders coming into operation, the figure for 1979 (approx. 160) being half that of 1973.

* *Department of the Environment. Digest of Environmental Pollution and Water Statistics, No. 3, 1980. HMSO, £9.80 net.*

RECENT DEVELOPMENTS UNDER THE CLEAN AIR ACTS PROCEDURE

Apart from the suspension of 23 smoke control programmes already referred to, several smoke control orders have fallen by the wayside in the past two years. In 1979 the Harrogate No. 9 Order (Christchurch) was withdrawn by the local authority and in 1980 the Portsmouth No. 5 and the Leeds City No. 9 (Garforth South) Orders were both withdrawn by their respective local authorities. Following public inquiries and DOE decision, the Derby City No. 2 (Breadsall) SCO, submitted March 1979, the Allerdale No. 8 (Town Centre, Cockermouth) SCO submitted January 1979 and the Wakefield City (Featherstone/Snydale) (No. 2) SCO submitted July 1979 were subsequently not confirmed. In all cases, DOE judgement was that these orders were not justified at the present time. More alarming are two recent revocation or orders, Bracknell No. 7 and No. 8. The revocations were made after the No. 7 Order had been in operation for some time and the No. 8 Order had already been confirmed by DOE following a public inquiry.

Public inquiries into orders have been on the increase, often causing delays in progress of at least a year. If the decision following public inquiry went against the order, the whole programme might be suspended indefinitely. However, while there have been some negative decisions, the picture is not all black. Two recent successes have been the decisions on the Brighton No. 5 Order and the Bristol No. 16 SCO, approved by DOE following public inquiry. These both covered predominantly residential urban areas with mainly older type housing and were thus in DOE's view suitable for smoke control to apply. There were nine outstanding objections to the Brighton No. 5 Order and 2 petitions and a further letter were submitted at the inquiry. Considerable public feeling against the smoke control order was whipped up before the inquiry took place in June 1980. One of the main grounds for objection was that a more serious pollution problem from motor traffic existed. Both the Brighton Council and the National Society for Clean Air (who were represented at the inquiry by the Secretary General) pointed out that whether there is or is not pollution from road traffic does not in any way make the control of domestic smoke emission less important.

What is causing public feeling against smoke control in some areas? Certainly one factor is the rise in the cost of 'clean' fuel, especially gas, which has made the cost of coal seem more attractive. Where the householder still wants an open fire, comparison of the relative heat output of coal and solid smokeless fuel show the clean fuel to have an advantage. But in most cases it is difficult to persuade people to think of fuel in terms of calorific value rather than in terms of cost if they are not interested in the basic clean air advantage. It may well be that younger people, in particular, do not remember the severity of domestic air pollution in the past. They are not alive to the danger of reversion to that state through increased and widespread use of bituminous coal on open grates. That there is a reversion is evident from a recent survey carried out by the National Society for Clean Air, which showed that sales of coal are on the increase in smoke control areas in some parts of the UK. The problem has become so acute in Scotland that the NSCA's Scottish Division is considering submitting proposals for the licensing of coal merchants to the Secretary of State for Scotland (vide *Clean Air,* Vol. 10, No. 1). Most recently Sheffield has found that more than 200 houses in a smoke control area (one of the first made there, in 1964) were burning coal. Sheffield has decided to mount a publicity campaign to persuade householders to switch back to smokeless fuel and intends to prosecute coal merchants rather than householders.

Reaction by certain members of the public against smoke control also stems from a personal view of local needs and priorities and this in turn puts pressure on elected representatives at local level. It is therefore harder for local authorities to maintain the determination to carry out smoke control programmes without some very positive guidance on national priorities. In terms of the EC Directive on Smoke and SO2 (Health Protection Standards) such guidance is available in the list (prepared by DOE) of areas at risk of exceeding or approaching the limit values laid down in the Directive. There is obviously a need to identify the problem in each area much more thoroughly and specifically, especially since some of the areas identified (e.g. Newcastle upon Tyne, Sheffield, and many London boroughs) are those which have already completed widespread smoke control programmes. It has been suggested that publication of such a list is a disservice to smoke control in that it takes the pressure off other local authorities not identified in the list and which have not yet embarked on a programme of smoke control or which have suspended their programmes.

NEW PROCEDURE – THE POSITION IN 1981

The Consultation Document on revised procedures for smoke control, issued for comment in November 1980 by DOE, was eventually followed by a Circular (11/81, DOE, 18/81, Welsh Office) of 27 March 1981 entitled 'Clean Air. Procedure for Domestic Smoke Control. EC Directive on Sulphur Dioxide and Suspended Particulates'. The outline procedure set out in the Circular will be put into effect in 1982, as there is "insufficient time to seek bids and issue allocations for 1981/82". Therefore, general approval in principal has been given to all smoke control expenses for the year ahead, providing the orders concerned conform to certain criteria (set out in Para 10 of the Circular). The Circular makes clear DOE concern that there should be a phased approach to smoke control generally, and that smoke control should go ahead as quickly as possible in the appropriate places.

The change in legislation will allow local authorities far more freedom to proceed independently with their own programme where it is considered to be a local priority. But there are pressures against priority being given to smoke control. The first stems from the financial situation, with local authority spending in every area coming under close scrutiny both at local and central government level. There have been fears that finance from central government for smoke control would be directed solely towards those areas identified as being at risk under the terms of the EC Directive. This fear may well inhibit many local authorities from undertaking even a rough forward projection of likely costs of smoke control on a rolling programme basis. However, although priority obviously will be given to certain areas, the fear would seem to be unfounded unless great financial expenditure is involved and DOE do not agree on the need for a particular order. It is more likely that a variety of local pressures will make smoke control less attractive to some local authorities. This in itself would be serious enough, but perhaps more dangerous at the moment is the threat of a reversion to widespread bituminous coal burning in already established smoke control areas. This is something that can only be countered by a strong demonstration of the will to pursue and uphold their policy by local authorities which have a well-established concern for clean air.

AUTHOR'S NOTE

This article summarises my own appreciation of the current situation with regard to smoke control. The Society would welcome any views on the subject from readers, and in particular, local authority members of the Society.

NEW SMOKE CONTROL ORDERS

The lists below are supplementary to the information in the issue of **Clean Air (Vol. 10, No. 6)** which gave the position up to **30th June 1980.** They now show changes and additions up to **30th September 1980.**

Some of the areas listed are new housing estates, or areas to be developed for housing. The total number of premises involved will therefore increase.

The list of new areas in operation of smoke control is based on the plans submitted to the Department of Environment, but may erroneously include some local authorities who have made postponements without notifying the Ministry of the fact.

ENGLAND
NEW SMOKE CONTROL ORDERS IN OPERATION

NORTHERN

Allerdale No. 9 (Gray Street, Workington); Langbaurgh No. 1 (Redcar Central); North Tyneside No. 13, No. 14, No. 15, No. 16, No. 17 and No. 18; Stockton-on-Tees No. 18 (Roseworth South); Sunderland No. 17 and No. 18.

NORTH WEST

Bolton No. 14 (Bolton No. 53) and No. 15 (Farnworth No. 9B); Burnley No. 2; Halton No. 18 (Runcorn No. 13) (Parish of Moore); Liverpool No. 30, No. 31, No. 32 and No. 33; Manchester (Beswick) and (Woodlands Road Extension); Oldham No. 33 (Freehold) and No. 34 (Oak Street/Shawside);* Rochdale No. 6 (Completion); Wigan (Sherington No. 1) and (Ashton No. 3).

YORKSHIRE & HUMBERSIDE

Calderdale No. 24 (Shelf-Shelf Moor); Wakefield (Durkar & Crigglestone No. 1). (Normanton No. 4) and (Pontefract No. 11).

WEST MIDLANDS

Birmingham No. 169, No. 172; No. 173, No. 174 and No. 534; Dudley No. 139 (Woolaston North) and No. 140 (Coseley); Lichfield No. 3; Tamworth No. 7A, No. 16 and No. 17; Walsall No. 27 (Birchills) and No. 29 (Coppy Hall, Consolidation); Wrekin No. 5; Wyre Forest No. 4.

EAST MIDLANDS

Ashfield No. 9 and No. 10; North East Derbyshire No. 26 (Clay Cross West).

EAST ANGLIA

Peterborough No. 8 and No. 9.

SOUTH WEST

Cheltenham No. 10 and No. 11; Exeter (Aldens Farm).

SOUTH EAST

Dartford No. 18 and No. 19.

* **NOTE:** Wrongly entered as 'In Operation' in the lists for April-June 1980.

LONDON BOROUGHS

Hillingdon No. 34, No. 36 and No. 37; Kingston upon Thames No. 27.

NEW SMOKE CONTROL ORDERS CONFIRMED BUT NOT YET IN OPERATION

NORTHERN

Langbaurgh No. 9 (Redcar Sea Front) and No. 10 (Grangetown, Bolckow Road); North Tyneside No. 19, No. 20, No. 21, No. 22, No. 23 and No. 24; South Tyneside No. 7.

NORTH WEST

Warrington BC No. 5 (Appleton, Stretton, and Hatton).

YORKSHIRE & HUMBERSIDE

Rotherham (Wickersley).

WEST MIDLANDS

Birmingham No. 535; Dudley No. 141; Nuneaton No. 19 (Bedworth Central); Warwick No. 14; Wolverhampton No. 23 (Penn Area); Wyre Forest No. 6.

EAST MIDLANDS

Chesterfield No. 13 (Old Whittington); Derby No. 34 (Babbington and Litchurch); Gedling No. 8; Lincoln No. 18.

EAST ANGLIA

Peterborough No. 10 and No. 11.

SOUTH WEST

Bristol No. 16; Cheltenham No. 12 (Kings Park).

NEW SMOKE CONTROL ORDERS SUBMITTED BUT NOT YET CONFIRMED

NORTHERN

Darlington No. 19 (Geneva Crescent); Langbaurgh No. 10 (Grangetown Bolckow Road).

NORTH WEST

Ellesmere Port and Neston No. 18; Manchester (North Openshaw); Wirral No. 3 (Central).

YORKSHIRE & HUMBERSIDE

Kirklees (Batley No. 11).

WEST MIDLANDS

Birmingham No. 175 and No. 535; North Warwicks No. 7; Walsall No. 30 (Bloxwich); Wrekin No. 6; Wyre Forest No. 6.

EAST MIDLANDS

Ashfield No. 11; South Kesteven No. 12 (Grantham No. 28).

LONDON BOROUGHS

Hillingdon No. 41 and No. 42.

NOTE: Bracknell No. 8 SCO (Sandhurst/Little Sandhurst) which was due to come into operation 1.7.1980 has been revoked. The Bracknell No. 7 SCO (Sandhurst/Ambarrow) which came into operation 1.7.1979 has also been revoked.

SCOTLAND

NEW SMOKE CONTROL ORDERS IN OPERATION

Glasgow No. 2 and No. 3

NEW SMOKE CONTROL ORDER CONFIRMED BUT NOT YET IN OPERATION

Motherwell District (Yett Farm & Whittagreen Farm, Newardhill).

NEW SMOKE CONTROL ORDER SUBMITTED BUT NOT YET CONFIRMED

Renfrew District (Linwoods).

NORTHERN IRELAND

NEW SMOKE CONTROL ORDERS CONFIRMED BUT NOT YET IN OPERATION

Belfast CC No. 17; Craigavon BC No. 8.

The lists below show changes and additions up to **31st December 1980.**

ENGLAND

NEW SMOKE CONTROL ORDERS IN OPERATION

NORTHERN

Castle Morpeth No. 2; Gateshead No. 14, No. 15 and No. 16; Hartlepool No. 36; Langbaurgh No. 6 (South Bank East) and No. 7 (Redcar Lord Street, West); South Tyneside No. 5 and No. 6; Stockton-on-Tees No. 19 (Mount Pleasant); Sunderland No. 19 and No. 20.

NORTH WEST

Blackburn No. 20; Bolton No. 16 (Bolton No. 55a); Ellesmere Port & Neston No. 17; Hyndburn No. 40; Manchester (Collyhurst Street Extension); Oldham No. 31 (Grotton); Pendle (Reedley); Preston No. 41; Rossendale No. 3 and No. 4; South Ribble No. 9 and No. 10; St. Helens No. 22; Stockport No. 21 (Bredbury/Woodley); Tameside (Longdendale No. 2); Wirral No. 1 (Mersey) and No. 2 (Tranmere).

YORKSHIRE & HUMBERSIDE

Kirklees (Batley No. 10) and (Huddersfield No. 19 Berry Brow); York City No. 8.

WEST MIDLANDS

Coventry No. 23 and No. 24; North Warwickshire No. 6; Wyre Forest No. 5.

EAST MIDLANDS

Bassetlaw (Worksop Area No. 7) (Kilton); Broxtowe No. 4 (Kimberley); Derby No. 31 and No. 33; Mansfield No. 5 and No. 6; Rushcliffe No. 3; South Kesteven No. 11 (Grantham No. 27).

SOUTH EAST

Canterbury (Studd Hill No. 1); Guildford No. 5; Milton Keynes No. 6; North Bedfordshire No. 11; Southampton No. 20 (Freemantle No. 2).

LONDON BOROUGHS

Hillingdon No. 38.

NEW SMOKE CONTROL ORDERS CONFIRMED BUT NOT YET IN OPERATION

NORTH WEST

Manchester (North Openshaw); Pendle (Earby/Foulbridge); South Ribble No. 11 and No. 12; Wirral No. 3 (Central).

YORKSHIRE & HUMBERSIDE

Kirklees (Batley No. 11).

WEST MIDLANDS

Birmingham No. 175 and No. 537; Walsall No. 30 (Bloxwich).

SMOKE CONTROL AREAS

Progress Report
Position at 30th September 1980

(Figures supplied by the Department of the Environment, the Welsh Office, the Department of the Environment for Northern Ireland and the Scottish Development Department).

	England			*Wales*			*Scotland*			*Northern Ireland*		
Smoke Control Areas Confirmed to 30.6.80	5,187			34			282			80		
Acres		1,815,161			3,331			159,808			19,411	
Premises			7,584,067*			10,754			641,531			58,516
Smoke Control Areas Confirmed (1.7.80 - 30.9.80)	25			—			1			2		
Acres		16,752			—			49			219	
Premises			63,628			—			501			3,852
Totals	**5,212**	**1,831,913**	**7,647,695**	**34**	**3,331**	**10,754**	**283**	**159,857**	**642,032**	**82**	**19,630**	**62,368**
Smoke Control Areas Submitted (1.7.80 - 30.9.80)	16			—			1			—		
Acres		10,171			—			2,599			—	
Premises			27,511			—			3,867			—
Grand Totals	**5,228**	**1,842,084**	**7,675,206**	**34**	**3,331**	**10,754**	**284**	**162,456**	**645,899**	**82**	**19,630**	**62,368**
Smokeless Zones (Local Acts) in Operation	44			—			—			—		
Acres		3,400			—			—			—	
Premises			41,060			—			—			—

* Total 'confirmed premises' up to 30.6.80 revised from previously published figure (Vol 10, No 6) due to receipt of corrected DOE figure

SMOKE CONTROL AREAS

Progress Report
Position at 31st December 1980

(Figures supplied by the Department of the Environment, the Welsh Office, the Department of the Environment for Northern Ireland and the Scottish Development Department).

	England			*Wales*			*Scotland*			*Northern Ireland*		
Smoke Control Areas Confirmed to 31.12.80	5,212			34			283			82		
Acres		1,831,913			3,331			159,857			19,630	
Premises			7,647,695			10,754			642,032			62,368
Smoke Control Areas Confirmed (1.10.80 - 31.12.80)	14			—			2			—		
Acres		10,021			—			4,549			—	
Premises			25,720			—			5,379			—
Totals	**5,226**	**1,841,934**	**7,673,415**	**34**	**3,331**	**10,754**	**285**	**164,406**	**647,411**	**82**	**19,630**	**62,368**
Smoke Control Areas Submitted (1.10.80 - 31.12.80)	14			—			1			—		
Acres		9,774			—			546			—	
Premises			25,901			—			5,498			—
Grand Totals	**5,240**	**1,851,708**	**7,699,316**	**34**	**3,331**	**10,754**	**286**	**164,952**	**652,909**	**82**	**19,630**	**62,368**
Smokeless Zones (Local Acts) in Operation	44			—			—			—		
Acres		3,400			—			—			—	
Premises			41,060			—			—			—

EAST MIDLANDS
Ashfield No. 11; South Kesteven No. 12 (Grantham No. 28).

LONDON BOROUGHS
Hillingdon, No. 39, No. 41 and No. 42.

NEW SMOKE CONTROL ORDERS SUBMITTED BUT NOT YET CONFIRMED

NORTH WEST
Liverpool No. 35; St. Helens No. 23; Tameside (Mossley No. 2).

YORKSHIRE & HUMBERISDE
Selby No. 1.

WEST MIDLANDS
Birmingham No. 176, No. 177, No. 179, No. 536, No. 537 and No. 538; Wyre Forest No. 7.

EAST MIDLANDS
Broxtowe No. 6 (Nuthall East).

SOUTH WEST
Exeter (Sobeys Farm No. 1) and (Sobeys Farm No. 2).

SCOTLAND
NEW SMOKE CONTROL ORDERS IN OPERATION

Dundee District (North Central); Edinburgh District (Comely Bank); Glasgow No. 4 and No. 5; Renfrew District (Johnston North): Strathkelvin District (Wester Mains).

NEW SMOKE CONTROL ORDERS CONFIRMED BUT NOT YET IN OPERATION

Hamilton District No. 9; Renfrew District (Linwoods).

NEW SMOKE CONTROL ORDER SUBMITTED BUT NOT YET CONFIRMED

Dundee District (West Central).

INDUSTRIAL NEWS

Signals to New Chimney Problems

Smoke and other symptoms should be read to diagnose new problems in chimneys according to a fault-finding guide, *Chimney Faults and Cures,* published at £1 post paid by The Chimney Specialists Ltd., Sudbury, Suffolk.

The author, Neill Fry, whose company specifies new chimneys by post, introduced the guide on February 25 at the Royal Institution of Great Britain and said that fitting enclosed stoves to old or new brick stacks called for new standards to meet higher flue gas temperatures.

Temperatures of about 200 deg. C on the outside of brick stacks broke down the cellular structure of floorboards and a well-stoked and hot fire was enough to ignite the wood.

Mr. Fry reported a new estimate from the Solid Fuel Advisory Service that class one chimneys are now being incorporated into 25% of new houses under construction.

In their efforts to solve fuel cost problems some householders were re-opening fireplaces and others were closing them up.

Efforts to cut fuel costs cooled chimneys, said Mr. Fry. Enclosed combustion stoves including woodstoves could be run so slowly, or put so much of their heat into the room, that the chimney failed to pull or warm up and tarry deposits formed.

One unlooked for cause of chimney failure was draught-proofing a house, so efficiently there was not enough air for the flue. An unexpected cause of a smoky fire was too small a fire grate for the traditional fireplace built in the days when householders burned half a tree at a time.

Where there is no chimney stack householders can improve their fuel options by installing a solid fuel class one chimney using prefabricated steel or ceramic sections.

For a typical two-storey house the cost at under £500 (complete with a prefabricated housing for the fireplace) was about £1,000 less than building on a traditional brick stack, Mr. Fry said.

Reader Enquiry Service No. 904

New Multi-Client Project: Dust and Material Handling

Already 21 companies have agreed to participate in Warren Spring Laboratory's new project on Dust and Materials Handling. The objective is to produce much needed design and operation procedures for the minimisation, containment and handling of dust in bulk materials handling operations presented in a way that is of immediate value to engineers.

Currently planned Research Topics include: control of material dustiness; dust generation and control during: container filling and emptying (large and small scale), conveyor transfer and powder processing. Topics being considered for the future include dust control in stock piling. Regular information reviews and surveys of industrial practice will be used to identify, in consultation with the industrial participants, topics for further research. Membership of the project is open to all UK companies at a fee depending on company size; an additional entrance fee will become payable for companies joining after 30 June 1981.

Reader Enquiry Service No. 905

Johnson Matthey wins MacRobert Award

The 1980 MacRobert Award, the premier engineering award in Great Britain, has been won by a team of five men from the Johnson Matthey Group for the development of catalytic systems for controlling pollution from motor vehicle exhaust emissions.

At a private ceremony at Buckingham Palace on 16 December 1980, H.R.H. The Duke of Edinburgh, Senior Fellow of the Fellowship of Engineering, made the presentation of the MacRobert Award and £25,000 to Dr. G.J.K. Acres, Dr. B.J. Cooper, Mr. B.S. Cooper, Dr. W.D.J. Evans and Dr. D.E. Webster. The Gold Medal was accepted on behalf of Johnson Matthey by the Chairman, Lord Robens of Woldingham.

The MacRobert Award, made annually on behalf of the MacRobert Trusts, is presented in recognition of an outstanding contribution to innovation in the field of engineering, the physical technologies or in the application of the physical sciences, which has enhanced the prestige and prosperity of the United Kingdom of Great Britain and Northern Ireland.

The Johnson Matthey Group is a world

leader in the refining and fabrication of platinum and other noble metals for industrial application, and, in addition, has interests in such diverse fields as banking, bullion dealing, chemical production and the manufacture of specialised engineering materials, electronic equipment, pigments, ceramic colours and transfers.

The Rules and Conditions of the MacRobert Award require the project chosen to have achieved success in the domestic market and likewise to have made a significant contribution to this country's prestige and prosperity in overseas markets. Johnson Matthey technology has been used to advise car manufacturers in the United Kingdom, Europe, America and Japan on the use of catalyst systems for emission control. To date 10 million catalyst units have been supplied to motor companies selling cars in the United States and Japanese markets, including BL Cars, VW-Audi, Rolls-Royce Motors, Aston-Martin-Lagonda, Ford US and General Motors. Reader Enquiry Service No. 906

Cadmium In The EEC

Cadmium Association has published two special reports on the production, consumption and use of cadmium in the EEC and its impact on the environment. The work reported was undertaken on behalf of the Commission of the European Communities in 1978/1979 and with their permission is now being made available for wider circulation.

'Production, Consumption and Uses of Cadmium in the European Community 1965/1976' was prepared by the Cadmium Association, London. It examines the source from which cadmium is obtained and compares production in EEC countries with those of other major western world producers. Consumption patterns are also examined and the report includes detailed statistics on the main uses of cadmium. Technical aspects of the main uses are also discussed together with the factors likely to affect future consumption.

'Industrial Emissions of Cadmium in the European Community: Sources Levels and Control' was prepared by the Landesgewerbeanstalt Bayern, Nuremberg, Germany FR. It examines the chief sources of cadmium emissions to the environment and their relative importance. Methods and costs of controlling cadmium emissions are reviewed. The likely economic consequences of varying permissible emission limits are discussed.

Reader Enquiry Service No. 907

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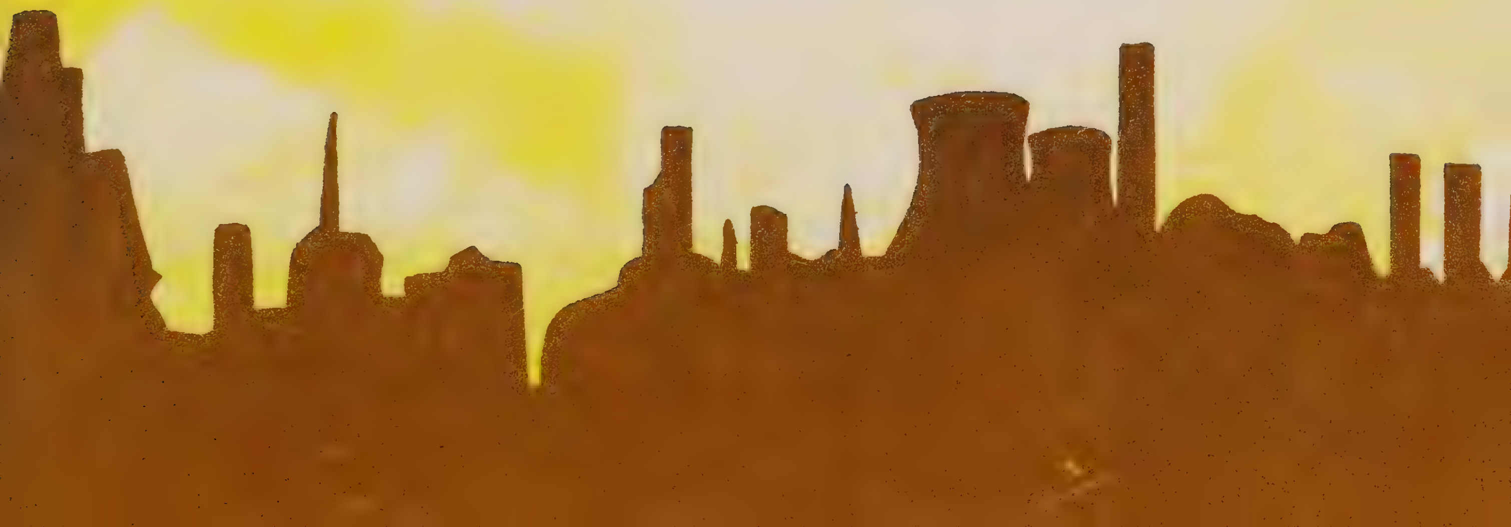

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CLEAN AIR

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DON'T MISS ....

What do people come to conferences for? Primarily, they come to learn and to contribute where they can some of their own knowledge to the discussions, and when money is tight and it is necessary to pick and choose among the range of conferences offered in a specialist field, the first consideration must be whether a particular conference offers value for money in terms of the content and topical interest of the programme. However, feedback from delegates to the NSCA's conferences indicates that of almost equal importance is the opportunity for making contacts during the event with other people in the same field. The Society's conferences are particularly worthwhile in this respect because of the wide range of interest represented by the delegates. This year's programme is also wide-ranging, covering many issues of immediate concern and it will be of interest to planners, professional environmental control practitioners and those with a concern or public accountability for the protection of the environment. Readers of this journal have received copies of the programme, but for those who have not yet studied it in detail, may we remind you that the topics to be covered are Environmental Impact Assessment, Low Frequency Noise, Industrial Pollution Control, Long Range Transport of Air Pollution, and Britain's Nuclear Future. The speakers are as usual of the highest order and the presentations and discussions are not to be missed. Register at once and you will enjoy a conference in the luxurious surroundings of Brighton's new Conference Centre, where you can renew old acquaintance and make new friends.

The 12th Congress of the International Association Against Noise will be held in Vienna, 20th - 24th April 1982. The subject is "Results and Forecasts in Noise Abatement" and the emphasis throughout will be on results of successful work concerning noise control in recent years and on necessary future action. Medical, legal, technical and economic problems will also be covered. Those wishing to present papers (not previously published or presented) should submit a 50-word abstract in German, English or French before 30th September 1981 to the Austrian Noise Abatement Society, Jagerstrasse 71, A-1200 Vienna, Austria. The Society recently became an Associate Member of AICB, and it is hoped that there will be a strong contingent from the UK at this important Congress. Additional information can be obtained from Jane Dunmore at the Society's Headquarters.

ENVIRONMENTAL PROBLEMS ASSOCIATED WITH OPENCASTING

G.R. Millington
Principal Assistant Environmental Health Officer
Wakefield Metropolitan District Council

Paper presented at the Yorkshire & Humberside Divisional Meeting, Wakefield, on Wednesday 18 February, 1981

INTRODUCTION

My own experience relating to environmental problems associated with opencasting extends over some years now, and I am grateful to Mr. Hinchliffe, my Chief Officer at Wakefield for his support. I must naturally indicate that opinions expressed in this paper are my own and do not necessarily reflect the attitudes of my employing authority.

THE ENERGY DILEMMA

If what the pundits tell us is true – and it seems highly probable – the World faces serious energy problems within the next few decades. North Sea gas will fail us, North Sea oil will fail us, nuclear power will kill us and fringe sources such as wind power, wave power and solar power will never contribute more than a fraction of our energy needs. Much research is being undertaken on the development of alternative energy sources: fuel from hydrogen, sugar cane, even fuel from sunflower seeds. Whether you have a personal belief in this kind of salvation or not, it is hard to deny that those countries with generous deposits of coal may well be feeling a little smug.

It is an odd reflection upon our society that the developed, industrialised nations, who are the main users of the world's oil resources, are in the long term so largely dependent upon the undeveloped oil producing countries; that we who speak so highly of democracy must court those whose concept of justice is vastly different to our own. Even more ironic is the tragic knowledge that energy resources will last longer only by there being more world recession and unemployment.

The energy dilemma, therefore, is not a matter which is simple of resolution and all the indications are that the vast coal stocks under our feet will be well and truly required in the future. The speed at which this demand will develop is probably the only matter of dispute.

THE EXTRACTION OF COAL IN THE UK

For many years the traditional method of winning coal was by deep mining and the need for coal to fuel the industrial revolution seemed to put aside all other considerations. Large areas of land disappeared under spoil heaps and whole economically dependent communities grew up amidst such a degree of environmental rape that even now the members of those communities measure their quality of life not by what it should be, but by whether the last twenty years has achieved any noticeable improvement. Fortunately, attitudes are changing and things *are* improving, but traditional coal mining has a lot to answer for.

With such a legacy of deep mining it is easy to see the attraction of the winning of coal by opencasting. Superficially this method has remarkable attributes. It is temporary, cheaper, needs fewer men; it is safer, creates no subsidence problems and the after-use of the land can be negotiable. With all these virtues why then do we not welcome it with open arms?

A form of opencasting, "Outcropping", has been practised in Britain for centuries. Coal, clay and gravel were the main minerals "out-cropped", but opencasting as we now recognise it started as a wartime expedient in the early 1940's. At that time it was controlled by Government but in 1952 the responsibility passed to the newly created Opencast Executive of the National Coal Board.

Early opencast operations were restricted by the size of the excavating plant available and in 1942 the maximum depth which could be worked was about 40 feet with a ratio of overburden to coal of about 5:1. By 1950 twice this depth was workable and present day sites are commonly over 250 feet deep with overburden/coal ratios of 25:1. This vastly increased capability explains why sites which were opencasted thirty years or so ago are not immune from opencasting again, and the opencast target tonnage is now 15 million tonnes per year by 1983.

During 1979 a total of 56 opencast sites were being worked in the United Kingdom with a total collective coal potential yield of 84 million tonnes, the total area of land being opencasted approximating to 25 square miles. The target figure for extraction from from West Yorkshire is 1.5 million tonnes per annum, or one tenth of the total United Kingdom target.

Some local authorities are opposed to opencasting in principle. Wakefield has in the past accepted it, provided that the environmental controls are reasonable and that at the end of the exercise some environmental benefit has accrued. A few weeks ago, however, Wakefield's policy was changed to total opposition of any future opencast mining. One thing is clear: for the local authority to get the best possible deal the subject has to be thoroughly understood, and officers need to keep a steadying hand on the reins.

THE PLANNING ASPECT OF OPENCASTING

In order to proceed with the development of an Opencast site the National Coal Board requires the Authorisation of the Secretary of State for Energy. The development is not subject to the more familiar pattern associated with everyday planning applications. Briefly it works as follows:—

(i) The National Coal Board will intimate to the County Planning Officer and the District Council Planning Officer the wish to opencast, and early discussions will take place on the general desirability of proceeding with the proposals. Published five year programmes are common, but are subject to annual review.

(ii) When agreement about the location of the site is reached, discussions as to particular requirements of control are entered into. It is at this stage, and no later, that the Environmental Health Department should be brought into the consultations.
(iii) Much correspondence and discussion will prepare a statement of case asking the Secretary of State for an Authorisation under the provisions of the Opencast Coal Act 1958. If the Board and the Local Authorities cannot reach agreement then the Local Authorities will object to the Secretary of State, and a Public Enquiry is likely to follow.

Whilst the above paragraphs are something of an oversimplification they are probably adequate to give the general picture, which is one of fairly lengthy prior consultation.

PUBLIC ENQUIRY

Should objections arise from certain parties, including the local authorities, the opportunity is there for virtually any person or organisation having an interest to give evidence at the Public Enquiry. Thus numbers of environmental groups tend to be heavily represented and an enormous variety of considerations may begin to emerge — the fate of flora and fauna, archaeological matters, footpaths, farming and so on almost ad infinitum. The result of this input — which I am not suggesting is at all irrelevant — is that Public Enquiries are measured in weeks rather than days, and provide quite a strain on local authority officers and resources.

The Opencast Executive will invariably be represented by a Barrister and the local authority witnesses will be subjected to a searching cross-examination. Environmental Health Officers, Planners and other staff who have gone through this experience are not likely to forget it. The technical expertise and professional ability of the local authority witnesses will be thoroughly tested, and the development within the Health Department of appropriate specialist knowledge should not be neglected, particularly since the retention of "outside" consultants and experts can be fearfully expensive.

THE AUTHORISATION

Eventually, in some cases perhaps inevitably, the Secretary of State for Energy will issue his "Authorisation". This document is quite lengthy, and substitutes for what would in other circumstances be a planning approval. Until recent times this document almost gave the impression that it had been written by or for the Opencast Executive. Recently, following strong local authority representations, including our own, on certain matters, it would seem that the Department of Energy is more agreeable to wording the authorisation with the needs of local authorities in mind, and has indicated that matters which have been agreed between the Opencast Executive and the Local Authority will appear in the Authorisation in an appropriate form whenever this is possible. Unfortunately the performance of the Department of Energy has not always been beyond reproach and discrepancies creep into the Authorisations which are difficult to rectify. The submission of a draft Authorisation to interested parties would be a useful measure to obviate this situation.

Monitoring of the requirements of the Authorisation is not done by the Department of Energy but falls to the County Council or the District Council depending upon the matters being reviewed and the degree of understanding achieved between the two tiers of local government, but customarily matters relating to environmental conditions will be dealt with by the District Council's Health Department, acting as consultants to the Planning Department.

ENVIRONMENTAL PROBLEMS

The main problems arising from opencast sites are noise, blasting vibration and dust. Until recently authorisations have tended to include "boundary noise levels" shown as a twelve hour Leq of attributable noise. The monitoring difficulties inherently associated with boundary noise levels, added to the twelve hour measurement requirement, convinced us that we ought to be aiming not for set levels, but for a "best practicable means" clause. The virtue of this approach is that the local authority can insist that the Opencast Executive or their contractor employs methods and equipment as up to date and as silent as possible. Since technical developments can be significant during the several years life of an opencast site we feel that the BPM approach is the proper one.

Further, it should not be forgotten that the nuisance value of a noise does not depend solely on its absolute level. The significance of frequency — that is, wavelength — is often not fully appreciated in terms of nuisance. Thus a lower level of noise at one frequency may in fact be more disturbing than a higher level of noise at a different frequency. Although the A-weighting network is used for Leq measurements, the weighting network itself depends upon the response pattern of the "average" person, and unfortunately people tend not to be average. Some time ago five individuals known to me volunteered for audiogram assessment with varying results. For example, at 500 Hz the hearing loss for the right ear varied from 10 to 20 dB, and at 2000 Hz the variance was from 10 to 35 dB. So I repeat: the significance of frequency in nuisance assessment is important.

The philosophy of BPM has now been accepted in principle by the Department of Energy after stubborn opposition from the Coal Board, and has appeared in an "Authorisation" issued in respect of the St. Aidens Extension, Leeds, in the Autumn of last year, and in the Springfield Authorisation, Wakefield, some weeks later. In the past, the Coal Board's attitude to noise has been rather confusing. For example they have publicly pronounced that B.S.4142 — the Method of Rating Industrial Noise — has no relevance to their opencasting activity and the British Standards Institute has supported this view. Yet, in 1972, a Coal Board publication "Coal and the Environment" included the following sentences regarding new opencasting workings: "...and so we arrive at a series of predicted working noise levels for the site at various points at the perimeter. Those are then compared with values calculated from the British Standard and the result tells us whether or not we can expect the noise at any point to constitute a nuisance. If it will, then we adapt the plan accordingly". One can only presume that this interface with B.S.4142 was abandoned by the Opencast Executive because anticipated noise levels regularly indicated a likelihood of nuisance arising. B.S.5228, which relates to the control of noise from construction sites, is being revised and is likely to include a section on opencast coal sites. Such incorporation in 5228 will in my view be a mistake.

Another instance where selective thinking is applied by the Opencast Executive is in the case of noise barrier mounds. In order to achieve maximum effectiveness such mounds should be either near the noise source or near the receiver, and should project above the noise path between the two. Properly sited and constructed they will reduce noise by several decibels. A barrier mound mid-way between source and receiver is not so effective, yet, if the site boundary happens to be at this position, then this is where the barrier is likely to be, and an increase in height must be called for. Now since the Executive has to store its topsoil somewhere on site so that it can be replaced on restoration it happily makes it into barrier mounds. Happily, that is, provided that the siting of the mound does not impinge on any area which is required for coaling! Thus, on sites of limited area, the height and construction of barrier mounds can become a contentious issue in negotiations, since the height determines the base width and thus the amount of land taken up.

Following the initial stripping operations, most of the noise from an opencast working comes not from the activities in the excavation itself but from the stocking of over-burden. These mounds can be quite high above ground level and the noise from dump trucks negotiating them can be considerable. The height and siting of the over-burden mound can prove critical in so far as noise nuisance is concerned. Any night-time working must also give cause for concern, my personal view being that it should be strenuously resisted. Another factor significantly affecting nuisance potential is the "hours of working" for the contract. A 7 a.m. start which is acceptable to the community during the week can prove an irritation on a Saturday morning when many people look forward to an extra hour in bed, and since it is not unknown for the night watchman to start warming up the engines of numerous dump trucks at 6.45 a.m. on a cold winters morning, complaints may arise. These trucks are of enormous size and power, some with a carrying capacity of over a hundred tons of material.

Vibration from blasting can prove a considerable nuisance to people living near opencast sites. Whilst blasting levels currently incorporated in authorisations are extremely unlikely to cause structural damage, they are of sufficient magnitude to be a nuisance in numbers of instances. The *amount* of blasting necessary is obviously related to geological factors. The *effect* of blasting relates not only to geological factors – that is the rock strata – but also to the size, type and pattern of charges, and weather conditions. This latter consideration, affecting as it does the effect known as "air overpressure", or the air-borne shockwave, is emerging as having some significance in terms of environmental nuisance. The effect is caused by the redirection and focusing downwards of acoustical energy and thus is not the most severe in close proximity to the site, due to the leap-frogging effect. It is difficult to control, requiring detailed meteorological information and accurate prediction.

The setting of levels relating to blasting can cause difficulties throughout early negotiations. The measurement is made in terms of "peak particle velocity" and is taken at the place where the vibration occurs. Over the years it has become clear that any limits set are related to structural effects and yet there is obviously a high potential for a "nuisance" effect upon persons. Since this occurs at a level much lower than that which would cause structural damage, the situation is difficult of resolution. Again, the Coal Board seem to have an unclear policy as they have accepted in the past levels of both 12 mm/second and 6 mm/second. Once again our thoughts have gone along the path to BPM.

There are many local authorities who will prefer that noise and vibration limits are written into Authorisations. The problem with absolute limits is that since they are the outcome of prolonged negotiation with N.C.B. they may well be not quite the limits that the authority would prefer to have been set. Then again, if complaints arise and work is proceeding within limits previously agreed by the local authority, the local authority can suffer acute embarrassment — even chronic embarrassment since the life of the site will be several years. BPM provides the means for improvements on an ongoing basis.

Dust can be a problem from the opencast site. Sources include drilling, blasting, dragline working, loading, tipping of over-burden, and traffic-raised dust from site roads. Research work being undertaken by our Department into the measurement of dust arisings is not yet completed but early results seem to indicate that dust deposition downwind of an opencast site could be of the order of two to three times greater than the levels upwind, in spite of efforts made to reduce emissions by watering of roads, use of dust control equipment and so on. Further investigations are necessary before final conclusions can be reached.

There is no doubt that there is a shortage of published information regarding dust emissions from opencasting. Whilst everyone agrees there is some dust emission, the question remains as to just how much more dust can be expected to arise due to the working of a site.

Monitoring equipment currently available seems to be relatively unsatisfactory, particularly in its ability to sample discriminately according to wind direction, time and volume. Within the Department we are developing a directional monitor which we hope will overcome some of the problems and the fact that we have a caravan for use in pollution control exercise has been a valuable help since operating conditions on and around opencast sites can be arduous in the extreme.

MONITORING OF OPENCAST SITES

It will by now be obvious that with a great deal of consultation, forethought and time it is conceivable that the conditions laid down as to the manner of working the site, the positioning of barrier mounds, the hours of operation and so on, may well prove adequate. It will be equally obvious that you can write as much as you wish on a piece of paper but if, as the site operations continue, the initial restraints are allowed to disappear into the mists of time, the exercise becomes pointless. This danger occurs in many aspects related to environmental health work. Lack of time and restrictions on resources and manpower can undermine control procedures to the extent that the original work and effort can become discredited. It is important that this situation is not allowed to occur on opencast sites or it is likely that one day Councillors will awake to discover that the local newspaper has found itself a crusade.

Staff must be adequately trained and encouraged to acquire a sufficient degree of knowledge and expertise to be able to examine, investigate and discuss working procedure and requirements with staff from N.C.B. and contractors. Indeed, where "best practicable means" is the control criterion it is essential that local authority staff should appreciate just what those words imply when related to any particular activity. In addition to being knowledgeable, staff should be properly equipped to carry out appropriate monitoring techniques. In this regard elected Council members should not, on the one hand, deny the funds for appropriate equipment and, on the other, say to their constituent complainants that they will see that "something is done". My own authority has been very good about such matters and has supported fully the Departmental concept of being adequately trained and equipped to do the job. We do not of course claim to be able to satisfy all of the people all of the time, but we are confident that any complaints are carefully and professionally investigated. It is probably a truism to say that where opencast sites are within a few yards of dwellings the situation can never be entirely trouble free, but organised control can go a long way towards keeping living conditions within tolerable limits.

THE ATTITUDES OF THE OPENCAST EXECUTIVE

In broad terms the Opencast Executive are conscious of their responsibilities on environmental matters and will approach the negotiating table with well documented proposals. It is up to the local authorities to evaluate these proposals and ask for improvements where appropriate. These "smaller considerations" may well cause disagreement, and local deviation from the norm is not one of the more enthusiastic elements of N.C.B. negotiations. Presumably they see any new proposal as potentially setting a precedent which may be prejudicial to their negotiations in other parts of the country. The great weakness from the local authority standpoint is that in the collective sense the N.C.B. is better organised. There seems to be no adequate facility within the local authorities' network for a "clearing house" approach to opencast mining. We should take care that we do not reach a situation of "divided we fall", and within West Yorkshire the County Council and the District Councils co-operate well. I have no intention of wearying you with a catalogue of difficulties we have come up against. Sufficient to say that our relationships with the Opencast Executive have not been all sweetness and light. Equally it would be unfair of me to allow to pass unacknowledged the many instances of willing co-operation and assistance displayed by the Executive, and I sincerely hope that our future relationship will be one of mutual understanding of each other's needs, notwithstanding the fact that a conflict of interests may arise.

Earlier in my paper I referred to the need for local authority staff to achieve competency. I do not mean that local authority staff should attempt to become experts in opencast mining. That expertise lies with the Opencast Executive and its contractors.

I cannot, however, overemphasise the need for staff to be sufficiently well informed to be able to understand what is going on at the site. Equally, a continuity of representation should lead to better relationships between local authority staff and site staff. The Health Department should also be represented on local liaison committees since it may be possible for certain problems to be resolved, or explained, on the spot. One further point which may be of interest. It is important to distinguish between work which is done by way of monitoring, on behalf of the Planning Officer, certain aspects of the Authorisation, and work which arises from complaints about "nuisance". There is an obvious danger of one becoming mixed up with the other. We have taken the view that the more conscientiously one monitors the planning aspects then the more confidently one can assess any nuisance aspect. To this end a limited number of our officers are now authorised under the provisions of section 280 of the Town and Country Planning Act 1971, in addition to their usual powers under public health legislation. In conclusion I would urge local authorities, in spite of financial restrictions and pressures, to resist the temptation to neglect the struggle against all forms of environmental degradation. Yet they should not be so blinkered by idealism or bureaucratic dogma that objectives become unrealistic and unachievable. In "Punch" a hundred years ago appeared the following lines which are as relevant now as they were then:

Well, yes, Old King Coal *is* a jolly old soul
And 'twill be a long time 'ere the world wags without him
But he needs Constitutional check and control
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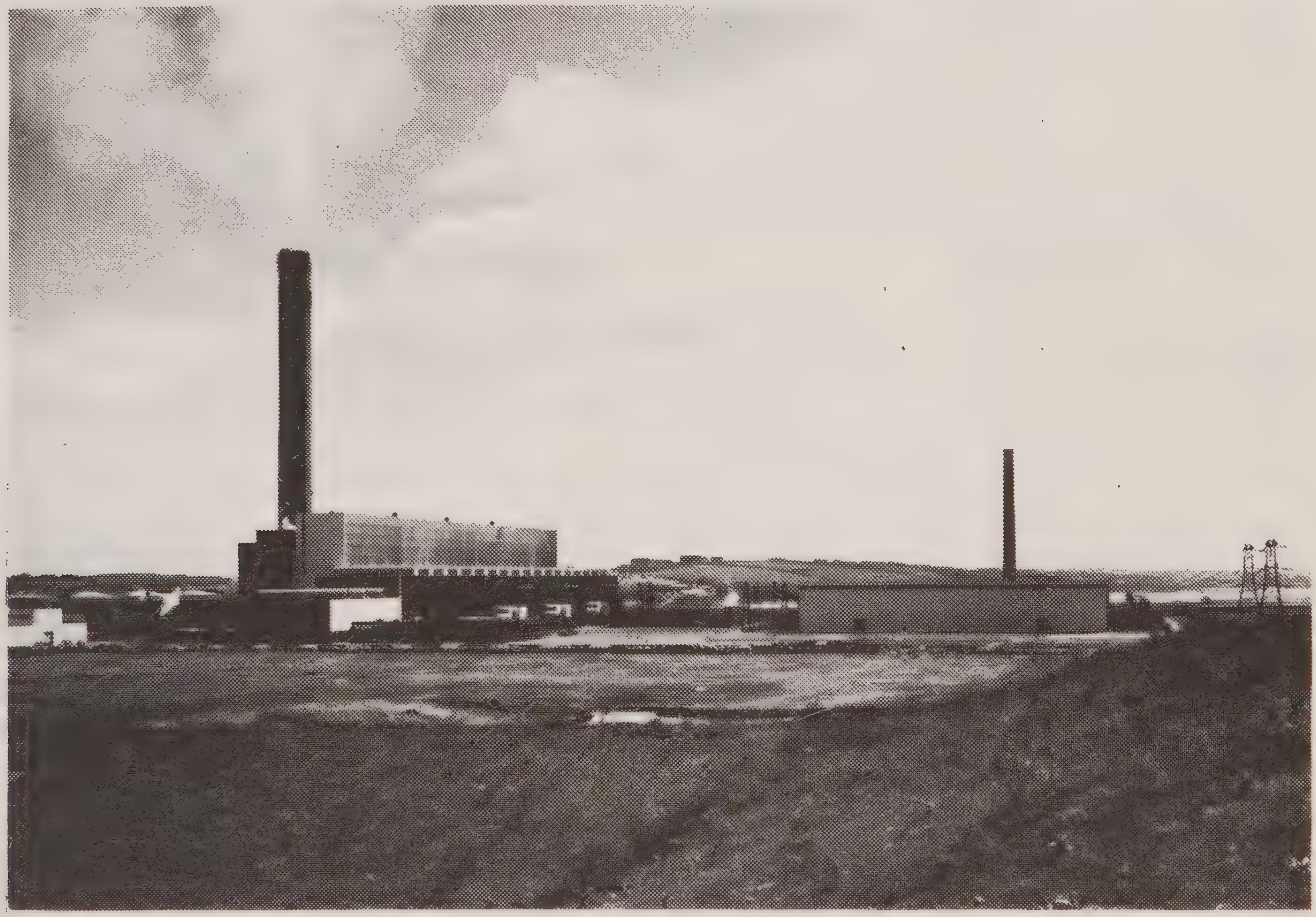

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ENVIRONMENTAL PROBLEMS ASSOCIATED WITH OPENCASTING A SELECTIVE REVIEW OF PRACTICAL CONSIDERATIONS

J. Russell Jackson
Scientific Officer, Wakefield Metropolitan District Council

INTRODUCTION

Because this presentation is intended to complement the paper by G.R. Millington, published in this issue, the same acknowledgements and disclaimers apply here also. However, owing to the nature of the subject matter, I think it important to stress one particular point. The opencast industry knows a great deal about coal extraction but relatively little about nuisance and the overall impact on local residents. With Local Authorities the spread of knowledge is the exact converse; and we do claim for our own the domain of nuisance lore and environmental impact assessment.

The tone of this review is intended to eschew the general and theoretical in favour of a focussing on the particular and practical. Moreover, the text will proceed by zooming-in on my experience of sites in and around Wakefield Metropolitan District. However, this parochialism will be diluted by the information and experiences gained in communications with local and central government officers in all parts of the U.K., and thus there is also a further acknowledgement due to the aid given by all these persons.

In deference to my colleagues who are Planners, I should point out that the environmental problems with which I shall here be concerned are in the main limited in scope to Noise and Air Quality matters.

Finally, the live exposition of this paper was almost entirely visual; taking the form of an extended slide show. Figure I gives a somewhat dramatic illustration of this with its general view of a site taken from a boundary fence line. The task therefore of honestly transcribing the detail into a written format has not been easy and, quite frankly, there is very little direct correspondence between what is contained herein and the way in which the presentation proceeded on the day. Here I have attempted to rank the various environmental problems by considering a combination of two aspects: Severity of Nuisance Potential and Intractability of Solution. In descending order of rank the problems are:—

VIBRATION AND NOISE FROM BLASTING

Obviously, under this heading there are contained at least two distinct problems nevertheless I have chosen to deal with them as one because to the casual observer there is a very strong association of ideas which, in some cases, can be totally misleading. This theme will be developed more fully as the discussion progresses; for the moment I propose to review as briefly as is practicable some of the basics of blasting practice at Opencast Coal workings. These practices may be thought of as a specialised application of more general Quarry Blasting techniques.

In this context, blasting is used as a means of breaking up hard rock. The method of doing this is the letting-off (the initiation) of explosives (the charge) within the body of rock so that very high level vibrations (the stress waves) are set up in the surrounding rock which causes it to shatter (the fragmentation). Blasting is an expensive operation and it is fairly reasonable to assume that it will not be undertaken unless absolutely necessary. When it is carried out, the minimum costs are aimed for, and so if the quarry manager has his sums right the blast is the smallest possible consistent with the required quality of fragmentation. Unfortunately, however, as the stress waves travel out through the rock they do not confine themselves to the job in hand, but continue through the ground and can appear as vibration problems in neighbouring premises and dwellings. This despite the considerable attentuation of the waves with distance; which incidentally is very variable in an unpredictable manner according to the geological environs of the site; and may vary considerably not only from site to site but also depending on the exact location of each initiation on any one site.

I shall refer to this stress wave as the Ground Wave throughout the rest of the discussion.

Figure I : General view of a Working Site.

The degree of fragmentation required for Opencast operations is relatively low because the machines employed to handle and transport the overburden are huge. However, large slabs of rock take longer to dig out and cause more damage to Faceshovel buckets and Dump Trucks bodies etc. In contrast also to general quarry blasting, there is no desire to displace the rock by means of the blast energy. Indeed, any significant movement would be an interference with the complex but well ordered layout of terraced benches and haul roads, and would constitute a danger to men and equipment which continue to operate at a safe but not infinite distance during the blast. Thus it is usual to refer to the action of the blast as 'heaving'. Taken in total, this all means that relative to the amount of rock to be treated the explosive charges are low.

A typical specification for a preparatory blast routine might be:—

(i) Drilling a pattern of 4½" dia. vertical holes in the rock bench, typically to a depth of 5-6 m. The pattern would consist of a rectangular array with spacings of perhaps 4 m.

(ii) Charging the bottom 1/3 hole depth with high explosives with suitable detonator mechanism attached.
(iii) Filling the remaining top 2/3 hole depth with a Stemming material such as small limestone chippings.
(iv) Wiring together all the holes with a connection to a shotfirer's electrical generator known as an Exploder.

Enough detail has now been introduced for me to begin consideration of the methods by which the industry has sought to control the severity of environmental insult from blasting.

1. Charge Weights (Vibration Control)

By studying the relationship between blasts on site of known charge and vibration levels produced at known distances it is possible to derive a curve on a graph which allows predictions of vibration levels at any desired but not yet tested, combination of charge weights and distances. Owing to the intrinsic variability of Ground Wave attenuation, however, a statistical approach is adopted when setting the charge weights to be used. Local residents will still experience a great variability therefore in the perceived vibration strengths from blast-to-blast up to the control maximum; with even this upper level being exceeded in a small percentage of cases. To the local resident it will, and does, appear as if no control at all is being exercised, and because of the small residual 'tail' of high strength Ground Waves it is dishonest for anyone to deny the possibility of the occasional blast being a totally unacceptable insult.

2. Delay Detonators (Vibration Control)

Experience over many years seems to point to the fact that peak environmental vibration levels are related to the maximum instantaneous charge detonated in a blast. To be able to blast a large area of rock in one round of initiations and still limit the peak

Ground Wave amplitude it is standard practice to use delay detonators. In this way, with a 25 ms standard delay between each hole in theory a round may consist of hundreds of individual holes being initiated without influencing the peak environmental vibration level which will only relate to the charge in each hole. This method of vibration control is, of course, merely a refinement of the one previously discussed. Using delays of only 25 ms instead of delays of say several seconds or more causes the round to be perceived by local residents as just one blasting event. However, from a 20 hole round the Ground Wave and thus the vibration effects at neighbouring properties is extended to a continuous time period of 2 to 3 seconds.

3. Site Layout (Vibration Control)

One way of protecting against the Ground Wave is to intersect the transmission path with a break in the ground structure e.g. a trench. This is not normally an economically viable method of control because trenches in general are expensive and time consuming to construct and these trenches in particular would have to be deep to prevent the diffraction of low frequency waves defeating the whole object of the exericse. However, as the typical Opencast site comprises chiefly of a progressive and massive trench or box-cut, a very real advantage in terms of vibration isolation can be achieved if the first cut is taken nearest to and parallel with dwellings, thereafter progressing away. This technique has hitherto not been given the prominence it deserves and we should expect more account of it to be taken in future.

4. Stemming (Noise Control)

The material placed above the charge in each hole is there to enhance the blast energy confinement and so improve the blasting efficiency. Without adequate stemming much more explosives per hole would be required to produce the same rock fragmentation. To perform well the stemming material should be purpose made, inserted with care and lightly compacted at the top end. Although part of standard quarry blasting practice, the stemming is very important environmentally because blast energy escaping directly out of the hole manifests itself as exceedingly strong acoustic noise waves, or Air Overpressure as it is commonly known in the trade. I shall refer to this avenue of disturbance as Air Wave, and suffice it to comment at the very least it produces a loud and startling noise for local residents. If the weather conditions are appropriate the Air Wave may be focussed and cause structural damage to buildings.

5. Electric Detonators (Noise Control)

To initiate the blast in each hole it used to be standard practice to 'wire-up' each hole not with electrical cable but with a cable of high explosive commonly called Cordtex. This rope-like high velocity fuse would be laid along the surface of the ground and through the stemming down each hole to the charge. Of course, any exposed Cordtex creates a good deal of noise because its detonation products are totally unconfined. Stemming material is shovelled onto any surface laid Cortex to try and overcome this but is a tedious job, difficult to do effectively and only of limited benefit any way.

It is now standard practice on Opencast Sites for the electrical wiring to extend at least as far as the top of each hole with only a short length of Cordtex confined to the hole itself.

A further refinement is to use what is known as Long Lead Electric Detonators. As its name suggests, the electrical wiring is taken to its ultimate extent and the detonator placed at the bottom of each hole. This has a more subtle effect than simply doing away with all Cordtex and is to do with the point in the column of explosives at which the initiation takes place. Long Lead Electric Detonators give bottom initiation and, therefore, for the initial part of the detonation the explosive charge itself also acts as stemming thereby increasing the confinement and efficiency of the blast.

6. Nonel (Noise Control)

Nonel is the trade name for the newest and environmentally most interesting blasting fuse. It consists of a small bore plastic tube on the inside of which is deposited a thin layer of high explosive. When initiated this explosive layer carries a high velocity detonation wave which acts as the fuse, but being inside the tube it causes no environmental effects whatsoever. The whole blast round can be 'wired' with Nonel; the chief disadvantage of the technique at the moment however is, I believe, the cost of this new product.

7. Alternatives to Blasting (Noise and Vibration Control)

Neglecting the trivial case where blasting is not really necessary at all, are there any reasonable alternatives? Indeed there are but the only one worth mentioning in this discussion is Ripping.

Ripping is performed using a large dozer to the rear of which is attached a large tooth-like spike. Hydraulically the spike is driven vertically into the top of the rock bench and the dozer sets off across the surface dragging the spike through the rock. When successful, the technique has similarities to ploughing, albeit at rather slower speeds than when soil is being turned.

If the rock is worthy of blasting, then none but the world's biggest and most powerful dozers will suffice. In Wakefield the method has been tested very seriously on very hard sandstones. Indications are that the cost was high compared to blasting and the fragmentation poor. Nevertheless the method may be indispensable to some degree on most sites in populated areas.

Elsewhere (1) I have discussed in more detail the nuisance effects of Opencast Blasting and so to conclude this section I wish to consider some aspects of the measurement problem from the Local Authority's point of view.

The noise and vibration from blasting is impulsive and heavily loaded with low frequency energy. For measurement of the Air Wave this means that a soundlevel meter with a rapid rise-time capability (50 *u*s time constant if possible) is essential to obtain a true peak reading and the measurement must be made without use of the A Weighting network. For the Ground Wave and its effects in buildings the equipment must in the first place be very good at measurements in the frequency range 2-20 Hz. This requirement limits the applicability of velocity transducers and favours accelerometers. However, there is a much more stringent requirement which the Local Authority's measurement system must fulfil; that is the essential capability of being able to capture the blast wave-form without prior knowledge of the exact time when the blast is to take place. For all practical purposes this rules out many systems which rely on high paper speeds in chart recorders to obtain the required wave-form resolution, given the fact that we are dealing with an intrinsically transient phenomenon. Modern technology in the form of Digital Event Recorders overcomes this difficulty but naturally, in Local Authority terms, the cost is not inconsiderable. If a simple peak level only is required then this order of sophistication is avoided but anyone who is familiar with more conventional noise measurements will know that peak level alone is a poor descriptor of a problem involving the subjective response of people. Having a good graphic display has enabled us to take a crticial look at claims and allegations which surround this topic. For instance, one spurious but oft quoted argument levelled at complainants is that the vibration effects of blasting in dwellings are not much different or more severe than the slamming of doors, heavy foot-falls etc. Figure II shows a comparison between a Ground Wave and a door slam measured at the same point on a dwelling. After studying these wave forms it is not difficult to understand the occupier's differing response to the two events. The amplitude scale for these wave forms is unimportant in the appreciation of this point and has, therefore, been omitted.

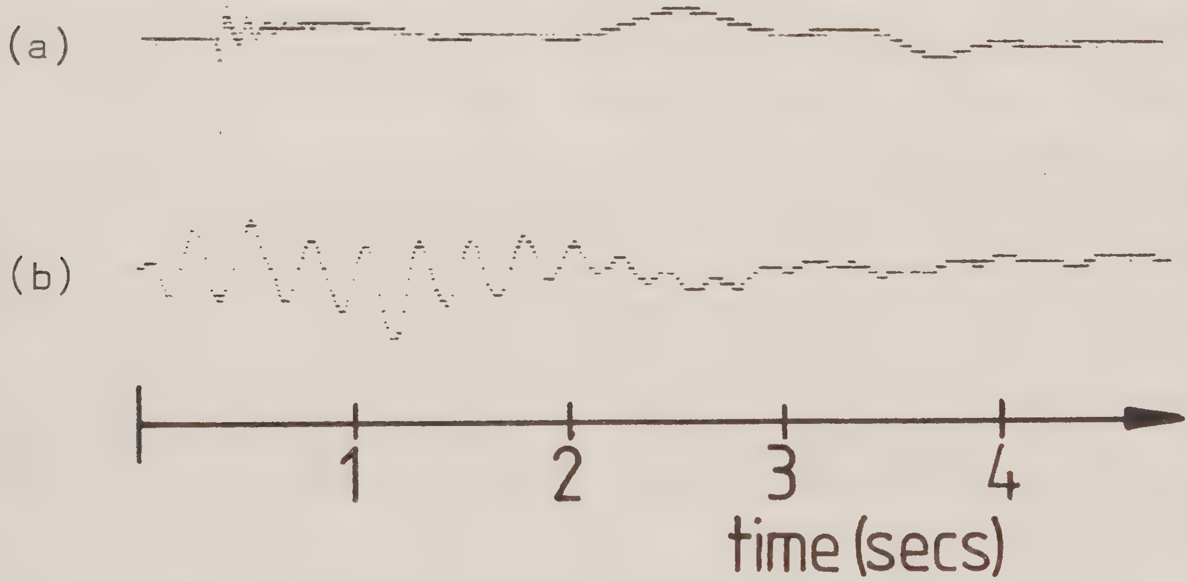


Figure II : Vibration wave-forms measured at Foundation level showing:—
(a) Vibration caused by the slamming of a door in the dwelling
(b) Ground wave from a blast at range 600 m.

DUST

This is undoubtedly the most intractable problem but of course the propensity for disturbing the populace is usually not as great as in the case of blasting. Neither the sources of dust on site nor the measurement of dust burdens at the receiver are problems in which anyone could claim satisfactory knowledge. Potential sources, along with comments on the current state of the art, are:—

(i) Drilling for Blasting — until about 3-4 years ago this used to be a very severe problem but was eliminated 'at a stroke' by the introduction of filter systems attached to each drilling rig.

(ii) Blasting — undoubtedly a regular contributor arising mainly from the moment when the stemming is blown out of the holes. Attempts have been made to control this more visually obvious source by using wet stemming and even stemming made from long and thin plastic bags filled with water. The degree of control was found to be not worth the considerable effort involved in this latter method.

(iii) Alternatives to Blasting — ripping is not without a degree of dust generation which in total might be equivalent to that produced by a commensurate blast.

(iv) Vehicles on Haul Roads — this is the one other source for which a solution is implemented routinely on sites. Water tankers, called Bowsers, with retro-sprays are used to water roadways continuously during those times when the weather conditions are drying. More often than not in this country this is a result of a drying strong wind rather than sunny periods. Taken at face value this would seem to be a simple technique to implement; but that is not the case. A strong wind can dry out the crucial top 10-20 mm of a roadway's surface within minutes or conversely the over zealous application of water creates dangerously slippery conditions on steep inclines.

(v) Excavation Plant — faceshovels and, in particular, drag-lines produce dust whilst excavating overburden. Elaborate methods of trying to dampen down the material handled have been attempted but all seem to have failed owing to the sheer scale of the operations.

(vi) Overburden and Soil Mounds — dust entrained by scouring winds passing over these structures constitute the big unknown, usually invisible, contribution. The erosion process obviously may proceed day and night, independent of whether the site is working or not. The establishment of a vegetative covering is thought to be one avenue to limit the extent of this problem, but this is only successful on top and sub-soil mounds. Overburden is usually quite sterile as far as plant life goes and there has been, from time to time, talk of sealing these surfaces with a spray-on plastic coating. Once again, the enormity of the undertaking will probably defeat the good intentions.

More generally, the big surprise about dust from Opencast Sites, which goes against common sense, is that even on so called wet sites, where there is a difficulty in removing mine water fast enough, there can still be a severe dust nuisance potential.

What of methods to measure the dust burden? This is another vast discipline, any thorough consideration of which is beyond the scope of this discussion. The techniques which are known to me and with which I have had involvement in practical implementation are: Standard Deposit Gauge, CERL Gauge, High Volume Sampling using Millipore type filters, Andersen type Fractionating Samplers, Royco type Particle Counters, Deposition Plates with Gravimetric Analysis, Deposition Plates with Microscope Analysis. For one reason or another, all except the last of these methods have proved to be inappropriate for monitoring the dust around Opencast Sites. At present we are carrying out an extensive assessment of the practicality of using a Deposition Plate method with a Microscope Particle Counting analysis.

DAY NOISE

The normal dayshift hours of Opencast Sites are:—

Monday to Friday	0700 hrs to 1900 hrs
Saturday	0700 hrs to 1300 hrs
Sunday	Not at all

Unlike conventional construction sites, say, where the operations are still labour intensive, here we find that the working and therefore the noise commences almost immediately at full power on the stroke of 0700 hrs and continues feverishly and unabated, save for short snap times, until the very end of the shift. This makes it a very long and weary day for any local resident who is sufficiently near the site to be severely affected.

Again, almost by definition, those workings which are near to dwellings produce noise emissions from greenfield sites or similarly undeveloped areas which hitherto would probably have been silent. This makes the sounds very noticeable and intrusive irrespective of absolute sound levels.

I wish to avoid any deep discussion of the level and frequency spectrum of sounds from Opencasting. There are so many possibilities for counter-examples in this area and I have myself experienced sites with boundary noise levels of more than 65 dB(A) Leq (1hr) and others with boundary levels so low that they could not be measured in a background ambient of 45 dB(A) Leq (1hr). Subjectively sites tend to signify their presence as a continuous background throb of many large diesel engines with the occasional virtuoso performance as one or other of the items of plant positions itself in a manner which accentuates its own acoustic capacity. This often happens when dump trucks are proceeding up to and along the top of large overburden mounds which frequently form the horizon in the direction of the site. Elsewhere (2) I have presented the solution to one such problem which was attained without much difficulty by slight alteration to the silencing system of a class of dump trucks.

It is possible to take the view that once a site has been given the go-ahead by the Secretary of State for Energy it is a certainty that the local environment will receive an enhanced noise dose. The Secretary of State, by virtue of the checks and balances which he has to circumnavigate in his authorisation procedure, is sanctioning this much. What he is not sanctioning is the creation of specific noise problems for which there is a ready solution at reasonable cost. I am of the opinion that the way to proceed with respect to overcoming noise problem at source is to deal with these specific problems on a continuing basis rather than seeking a blanket restriction on the boundary noise levels. One can refer to this iterative method as the Best Practicable Means approach; and as an example of how it works in practice consider what should happen if at some moment in time retro-fit Sound Proofing Kits become available for a particular type of plant; surely their use would automatically become the new baseline standard for what is reasonably practicable on existing sites as well as on new ones.

Intervening noise barriers, such as Baffle Mounds, Baffle Embankments, constructed of top and sub-soil, can be used very effectively to control noise at receiver, particularly in the case of one or two dwellings situated very close to the site boundary. However, care must be taken with the positioning and crest height specification if the barrier effect is to be significant. As a minimum preliminary to designing such a construction it is essential to obtain a sectional elevation showing the dwelling, the barrier and any points where noise sources might, during the life of the site, be situated. Barriers must be acoustically efficacious i.e. worthwhile, because their close proximity to dwellings can involve a great loss of visual amenity. By way of illustration Figure III shows what can happen to the outlook from a dwelling with even a really quite modest Baffle Mound. Local residents have been known to refuse the offer of a good barrier because of this factor alone.

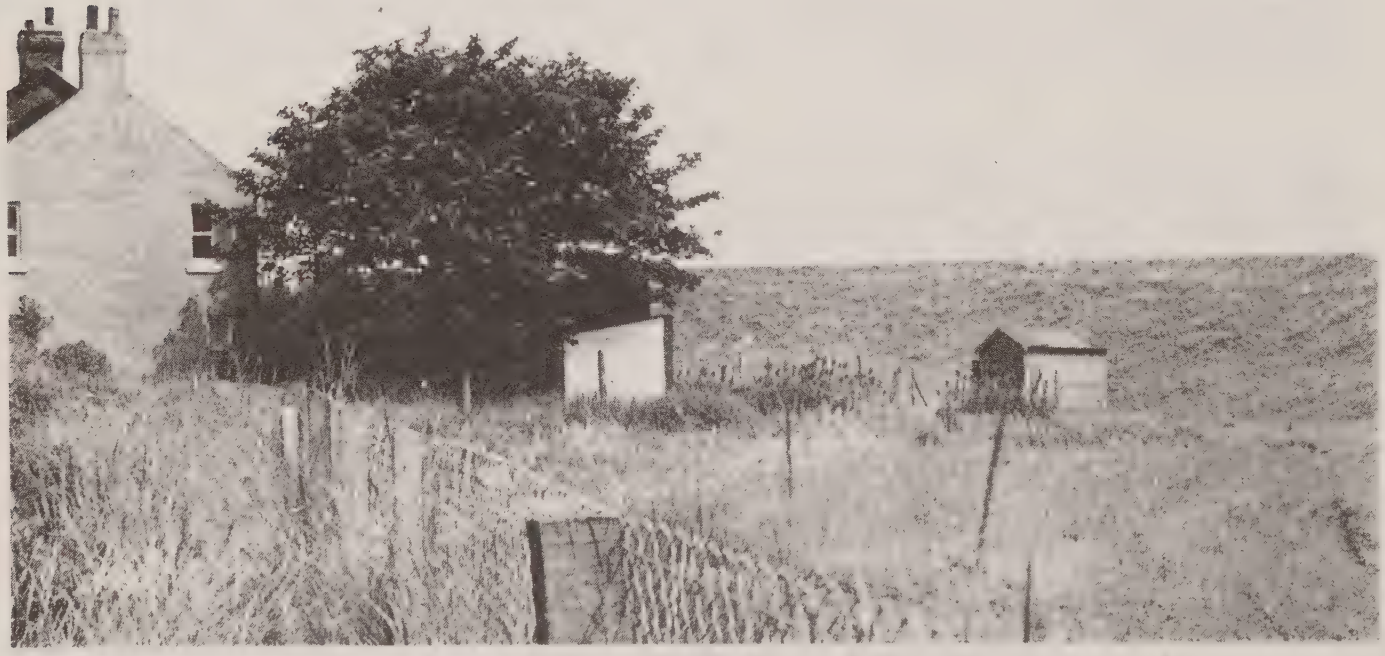
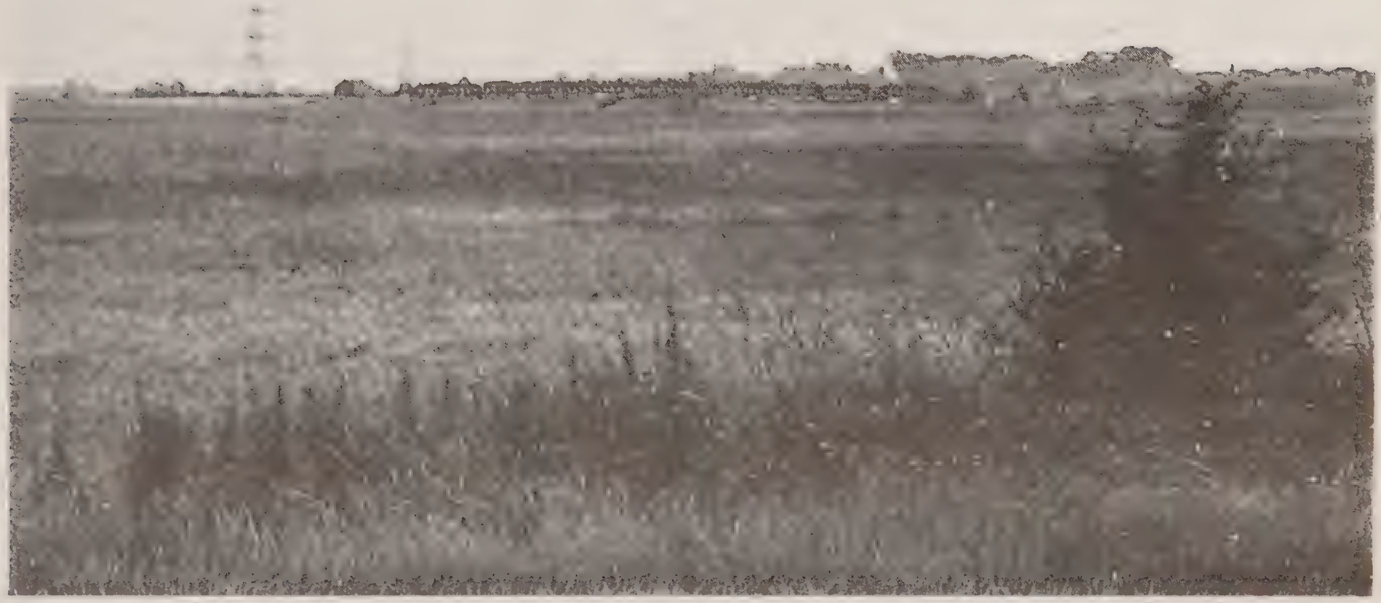
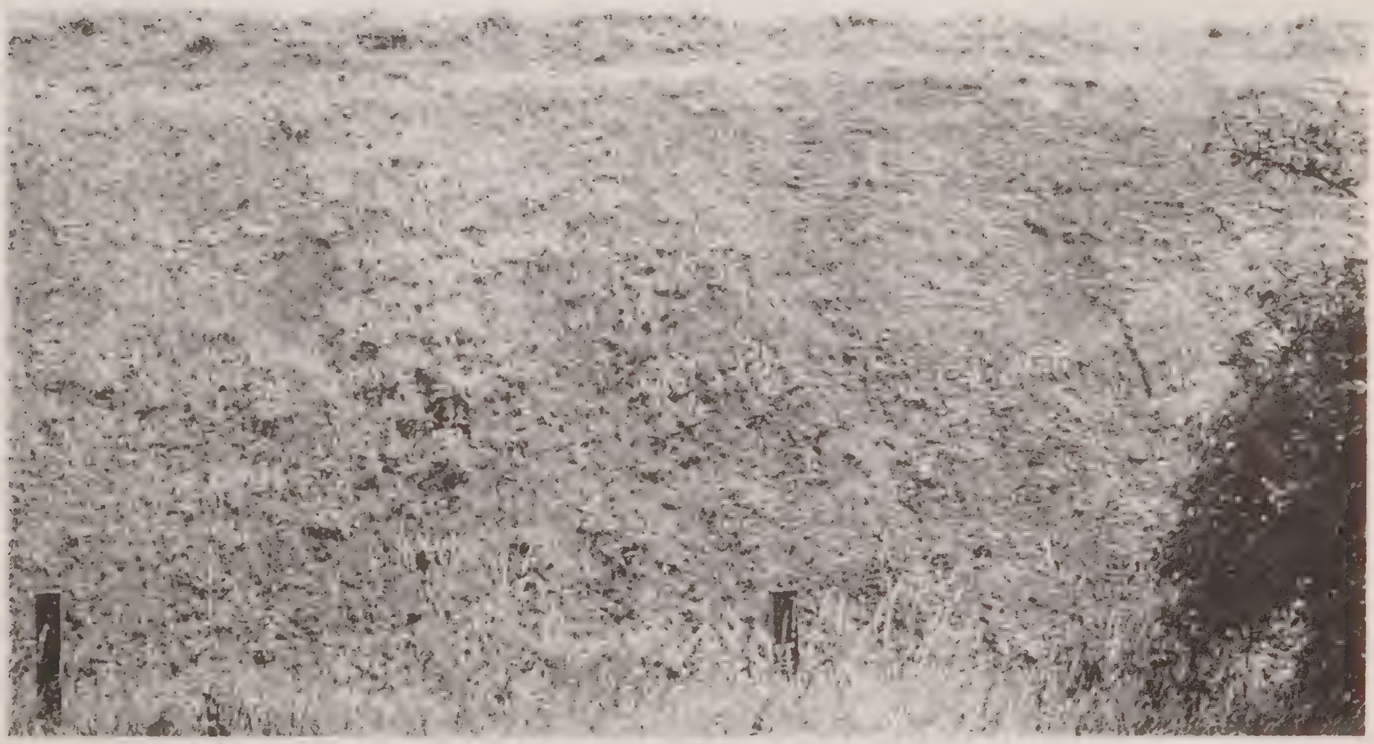


Figure III : Loss of Visual Amenity from Baffle Mound showing:—
(a) The Mound in relation to the house.

Yet another way of baffling noise can be arranged by organising the sequence in which an overburden mound is erected. If the first section to be built is contrived to be that portion nearest to dwellings with subsequent progress moving away from them the overburden can act as its own barrier for the plant working on it. This is analogous to the concept dealt with in the section on vibration from blasting, in which the first box-cut is used as a baffle trench for all subsequent ground waves. Here of course the baffle is built up into the air not down into the ground.



(b) The view from the house at ground floor level before the building of the Mound.



(c) The same view after the building of the Mound.

Finally, I would return to the starting point of this section, viz. hours of work. The most significant development in noise control strategy that could happen now would be if the early morning start-up times could be amended to 0730 hrs for weekdays and 0800 hrs for Saturdays. In fact, locally we may have recently obtained the latter concession for our future sites, the other still remains a victory for common sense to be won at some time in the hopefully near future. One argument against these changes asserts that reductions in the working week merely prolong the total life of the site thereby eliminating any net noise control gain. But anyone who knows anything about nuisance will be aware of the crucial role time of day plays in people's response to noise. The lost time, I would contend, could be added almost with impunity to the end of each shift; but the benefit to local residents of an extra ½ hr's peace in the morning would be inestimable.

NIGHT NOISE

Disposing with this topic is for me relatively easy because in and around Wakefield, with the exception of Electric Draglines and Water Pumps, there is no site working during the night (1900 hrs to 0700 hrs).

This drastically reduces the number and severity if not the intractability of problems during these time periods.

Noise from diesel pumps used to be a common difficulty but was easily overcome by the usual means of acoustic enclosures etc. Nowadays the problem is virtually non-existent as electric pumps have become capable of handling the load and are favoured by Site Managers for ease of operational use.

Electric Draglines are a night time nuisance to some of our local residents, but I fear nothing sensible can be done about it. The answer here is to prevent their working at night, and this we seem to have been successful in doing for the new sites which are coming on-stream.

CONCLUSION

It has been my intention throughout to treat this whole subject area to a relaxed, almost casual, analysis. By this approach I hope to have placed an emphasis on the obviousness of the environmental issues. True, some solutions to these problems are verging on the sophisticated, but no more so than with environmental problems in the wider sphere.

The Opencast Coal industry has a tendency to put itself in a special catagory, set apart from other polluters; but when the aura which arises from the scale of the undertaking is ignored what is left is really rather mundane.

Even now perhaps the greatest environmental problem associated with Opencasting is the difficulty experienced by individuals and individual Local Authorities in putting up well informed and forceful arguments against the background of a monolithic industry with resources on a national and supra-national scale.

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SMOKELESS HOME DEVELOPMENT – BY AREA

Based on data (as at 31.3.1981) supplied by the National Society for Clean Air, **Mike Overton** of Lonsdale Advertising Limited has prepared the table below which analyses the proportion of all homes covered by operational smoke control orders in the eleven standard areas (listed in order of development). Note: Wales was not included in the analysis.

Area	All Homes (000's)	Smokeless Homes (000's)	% Smokeless Homes Of All (Development)
London	2713	2560	94%
North-West	2317	1501	65%
Yorkshire/ Humberside	1745	1060	61%
Northern	1105	508	46%
West Midlands	1841	752	41%
Scotland	1848	625	34%
East Midlands	1347	418	31%
South-East	3568	546	15%
Ulster	554	73	13%
South-West	1544	91	6%
East Anglia	668	27	4%
	19250	8161	43% National Average

THE INSTITUTION OF ENVIRONMENTAL HEALTH OFFICERS

On 1 May 1981, the EHA received the new title of THE INSTITUTION OF ENVIRONMENTAL HEALTH OFFICERS.

The change of name reflects the high professional standing of the Association which is the only organisation concerned with "environmental health" as a total concept. The new name is also a step towards becoming a Chartered Institute.

The designatory letter for Fellows of the Institution is FIEH, and for Members, MIEH.

INTERNATIONAL NEWS

POLLUTION CONTROL UNDER THE REAGAN ADMINISTRATION

A new President of the United States brings in his wake new political appointments across the spectrum of government affairs, including within the Environmental Protection Agency (EPA). More significantly, Reagan became President on a ticket of deregulation and increased promotion of industry's interests in order to ensure economic recovery. Therefore it would seem, according to informed sources, that the environment will take a less prominent position in American affairs during the next four years at least. The Reagan Administration has already made proposals to cut the EPA budget for 1982 (from 1981 levels) and, while the cut for air pollution control action is relatively low (3.6%), the noise control budget is -81.9% and for effluent control the Reagan budget for 1982 is 28% (at S247.3 million) below the 1981 budget level.

The Reagan budget for EPA's 1982 'Air' programme (S239.1 million) places less emphasis on enforcement of inspection and maintenance regulations, reduces funds for mobile source research and programme implementation. It also includes deletion of an acid rain initiative, in spite of the discussions already held between President Reagan and President Trudeau in Canada on the subject and in spite of continued Canadian pressure for US action on acid rain.

With the Clean Air Act coming up for reauthorisation, debate on Clean Air Act amendments began in earnest in March 1981 with the formal presentation to Congress of the National Commission on Air Quality's final report and recommendations. Senator Gary Hart, Chairman of the Commission, said that the statute had generally worked well and, although it imposed substantial costs on both consumers and industry, it had not interfered significantly with industrial or energy development. This is obviously an essential case to argue in the face of the new Administration's attempts to relax controls which would significantly hold back future industrial progress and energy development.

Many statutory revisions have been proposed to the Clean Air Act, some of which have been so controversial as to provoke dissent within the Commission. However, the Commission is agreed on a statement reaffirming the basis for setting primary ambient air quality standards: "The current statutory criteria and requirements for setting air quality standards at the levels necessary to protect public health, without consideration of economic factors, should remain unchanged. Cost considerations properly belong to the design and implementation of programmes developed to meet those standards". Controversial proposals are those to eliminate ambient air quality attainment deadlines, reduce the "prevention of significant deterioration" programme, repeal lowest achievable emission rate requirements and expedite federal approval of major state air pollution decisions.

Senator Edmund Muskie, a long time supporter of the Clean Air Act, and Senate champion of environmental protection (who resigned from the Senate last year to become Secretary of State in the Carter administration) has accepted an environmental brief from industry: Muskie's decision to enter private law practice and act as a consultant to industry on the Clean Air Act reauthorisation must seem a turnabout to both environmental groups and to industry itself who had long feared Senator Muskie's spirited opposition in Congress. However, it appears that he will act primarily in an advisory role; he will not participate in Congressional lobbying and will not, initially, by involved in litigation.

NOISE CONTROL

The United States came late into noise control, and it is expected that even under the Reagan Administration, greater control of noise will continue in spite of the massive cut in the EPA's noise budget for 1982. Reagan proposes phasing out the entire EPA noise programme by the end of 1982 on the grounds that the benefits of noise control are highly localised and the function of noise control can be adequately carried out at State and local level without the presence of a federal programme. President Reagan seems to have discounted in this respect the impact of road vehicles. A federal initiative on control of noise from road vehicles could expedite control at state level, to improve noise levels overall.

Sources: *Inside E.P.A.* Weekly Report, March 13, 1981.
An Inside Washington Publication

Journal of the Air Pollution Control Association
(April 1981)

EUROPEAN CONFERENCE ON ACID RAIN (ECAR) – GOTEBORG, SWEDEN, 9 – 12 MAY 1981

Report by *Jane Dunmore*

This international conference of environmental organisations was arranged by four Swedish groups: Miljoforbundet (The Environmental Federation), the Swedish Society for the Conservation of Nature (SNF), Faltbiologerna (Swedish Youth Association for Environmental Studies and Conservation) and the Swedish Anglers National Association. The organisers received some financial support from the Swedish government which was used towards delegates' travelling and accommodation expenses. A limited number of voluntary environmental groups overseas were invited to send representatives, and about 50 such delegates attended, from Austria, Belgium, Denmark, Finland, German Federal Republic, Iceland, The Netherlands, Norway, Poland, the UK, USA, and Canada. The other 50 delegates were from environmental organisations in Sweden.

The purpose of the conference was to alert the international environmental movement to the problems of acidification in Scandinavia and to inform representatives from overseas about the effects of acid rain in Sweden. The organisers felt that pressure from environmental groups in the "polluting" nations would help to create the atmosphere of international co-operation at government level which the Swedes in particular are keen to promote. The background to the conference was the 1979 UN Convention on Long-range Transboundary Air Pollution. The Convention was signed by 34 nations but has been ratified so far by only nine countries, among them Sweden and Norway. Also considered significant by the organisers of ECAR was the publication in March 1981 of the OECD study "The Costs and Benefits of Sulphur Oxide Control". This study developed a methodology for estimating the costs and benefits of controlling sulphur oxide emissions from coal and oil-fired plants, concluding that control costs totalling S4.6 billion dollars (for the European nations of the OECD) would be within the range of estimated savings on improved lake quality, health, crops and building damage.

ECAR was well planned, with sessions for presentation of papers and discussion broken by visits to acid lakes in the Goteborg area and further afield, and by workshop sessions to discuss national and international strategies on the problem of acid rain. The term "acid rain" was widely used during discussions, although inaccurate, as one of the first speakers, Per-Inge Grennfelt from the Swedish Water and Air Pollution Research Laboratory, pointed out. Dry deposition of SOx and NOx is greater in Sweden than wet deposition (acid rain/acid snow). Dry particles of SOx and NOx fall to earth before they have time to change into sulphuric and nitric acid as they travel in clouds. However, these particles carry molecules which can become acidic when mixed with surface water, rain, fog, dew or mist. The problem is therefore one of acid deposition rather than acid rain.

Discussing the impact of acid rain on soil, forestry and agriculture, Folke Andersson, Professor at the Swedish University of Agriculture, explained the many different factors involved in any attempt to assess damage due to acid precipitation. Forestry methods themselves can lead to increased acidification of soils. Different soils have different buffering systems and it is necessary to understand the biology of the soil and to have a profile of an area from precipitation to bedrock in order to make some reasonable assessment of likely damage due to increased acidity from wet or dry deposition. This point was reinforced by geologist, Bo Lind, during visits to lakes of different buffering capacities in the area of Falbygden.

The Swedish Fisheries Board have now done a survey of Swedish lakes and have found that 18,000 out of a total of about 90 - 100,000 are acid. These lakes, poor in calcium, magnesium and nutrient, are situated (mainly in the south-west of Sweden) in areas with coniferous forests and pre-Cambrian bedrock. The pH of the acid lakes varies between 4 to about 5.5. Lakes have a natural defence mechanism or buffering capacity caused by the presence of hydrogen carbonate (HCO_3^-) as major ion. However, the majority of Scandinavian lakes and watercourses have low lime content, and thus a low content of hydrogen carbonate, and are therefore particularly vulnerable to acidification.

Acidification produces sweeping changes to lakes or watercourses, affecting every level of the aquatic ecosystem. Swedish acid lakes are characterised by the invasion of bog moss (sphagnum) which, together with undecomposed organic matter, establishes a carpet on the lake bottom sediment. The lake waters are unnaturally clear as a result of precipitation of humic substances to sedimentation on the lake bottom. The humus remaining in solution shifts colour with decreasing pH and the two effects result in an increasing transparency, to over 20 metres in some lakes compared with a norm of 6 - 9 metres. The general effect of acidification on lake fauna is a decrease in the total number of species and an increase (almost a population explosion) among those few species resistant to acid water, e.g. water boatmen, diving beetles, dragonfly larva, etc. The population explosion is probably due primarily to reduced fish predation. While some small fish may be directly killed by increased acidity in lakes, fish are most sensitive at the egg and larval stage and the failure of fish reproduction is the most significant result of acidification. Older fish of some species are able to survive in acid water and because of decreased competition for food, they often grow large and may have long, non-reproductive lives in the lake. Different species of fish have a differing sensitivity to acid water. Salmon, trout, arctic char and white fish are all very sensitive and disappear from lakes and streams when the pH is lower than 5 - 6. Perch and pike tolerate somewhat more acidified water, although they may be affected by increased levels of aluminium in lakes, leached out from soils by acid precipitation; damage to fish gills can result from high Al levels. During an organised visit to Harsevatten lake (an untreated 'reference' acid lake), species of plant and fauna were netted from the middle of the lake while the pH level of the water was metered. No fish were caught and the net merely trapped the sphagnum moss and water beetles typical of acid lakes. Lake pH was 4.5.

Although liming is regarded in Sweden as an "immoral" palliative, the extent of the acidification problem led the Swedish Government, in 1976, to initiate liming measures for restoring acidified lakes and rivers. This was done in order to save waters of special value and assess the efficacy of liming. Delegates to the Conference were shown liming in action at one lake, with the soft brownish coloured limestone being applied under pressure from a tanker. Different types of limestone, dolomites, lime slags etc. have been tried at various lakes. Methods of application range from the tanker method observed, to workers spreading lime with pressure hoses, and in some cases liming is done by helicopter, particularly where the lakes are inaccessible by road. The colour of the limestone e.g. white for winter, brown for summer, is important for aesthetic reasons, as weekend lodges and holiday homes are scattered in the woods around the lakes, and their owners object to lake shores dappled an unnatural white in the summer. The frequency of liming varies from lake to lake. A single application might produce a neutralising effect for some 5 - 10 years in a lake with a long retention time. However, waters with a very short turnover time might need yearly treatment which could lead to lime overburden on the lake shore or edge of the watercourse.

During presentation of papers to the conference, most speakers avoided emotive arguments, and stuck to factual accounts of sources of emission, technical means of control, and effects of acidification. After hearing these presentations, and seeing some acid lakes for themselves, delegates were asked to participate in Workshops on individual national strategies, international tactics, and a Conference Resolution.

The Swedish working group felt that there was a need for greater knowledge and understanding of the acidification problem among the general public, in Sweden as well as elsewhere in Europe. A substantial reduction in Swedish emissions was called for, and the Government was criticised for not requiring flue gas desulphurisation (FGD), especially on new coal burning plant.

The Netherlands have in recent years switched from natural gas to widespread use of coal. The Dutch Government tried to enforce the application of lime scrubbing to desulphurise flue gases, but the technique proved environmentally unacceptable in relation to lime extraction and slurry disposal. Delegates from the Netherlands felt that low energy use, together with investment in alternative energy sources, provided the only real solution. Britain's so-called "tall stack policy" had come in for criticism from some speakers and delegates, and in common with other national workshop groups, the delegates from Britain felt that more attention should be paid to the impact of national energy policy decisions on the long range transport of air pollution. While it was agreed that there were many factors involved in the acidification of lakes and soils in Sweden and other parts of Scandinavia, there was no doubt that sulphur and nitrogen compounds resulting from combustion of fossil fuels in Europe were transported over long distances and contributed to the acidiciation problem in vulnerable areas.

The British delegates considered the effect of emissions on the local (UK) environment, and concluded that the UK Government should seek to establish the detrimental effect of SO_2 emission on gross national product. They also felt that the Government should encourage investigations to establish the frequency with which tall stacks emit above the mixing layer, in order to quantify more accurately the contribution from sources in the UK to deposition at long range. Presenting these conclusions to the conference, the NSCA's representative explained the UK's 'best practicable means' control policy, reminding delegates that tall stacks were not unique to the UK and not the sole component of the British control approach. The British workshop statement called for a Select Committee of Parliament to be established, to re-examine BPM and ensure that they would be applied from the outset on any new development, and as soon as possible on existing fossil fuel burning installations.

The resolution from the Conference as a whole was drafted and re-drafted about six times by the Chairman of the Policy Group, Amin Rosencranz (Environmental Law Institute, USA). At the time of writing, the final version has not yet been received. The draft declaration was hotly debated at the last session of Conference; technical issues began to be overlaid by politics, although that element had not predominated in earlier discussions.

Interestingly, the conference discussions revealed a shift in the official Swedish position with regard to international action on limiting sulphur discharges. The Swedish Minister of Agriculture, Mr. Anders Dahlgren, had planned to address the Conference on May 11th. A government crisis prevented him from delivering his address personally; a civil servant did so on his behalf. The speech reflected Sweden's concern to get their own house in order, outlining progress in limiting the sulphur content of fuel, plans to purify and desulphurise flue gases, and the lime application programme (budgeted at Sw. Kr. 23 million for 1981/82). It also expressed Mr. Dahlgren's wish to pursue bilateral negotiations on environmental issues generally and trans-boundary air pollution in particular. Clearly, the Swedish Government accepted that no action would or could be taken immediately to limit emissions. The Swedish Government seemed to recognise that more could be achieved through negotiation with other governments than by maintaining an unacceptable hardline attitude. Finally, Mr. Dahlgren's speech emphasised the importance of the international environmental movement as creator of public opinion and supplier of information. "The acidification issue is a matter demanding environmental consciousness to a high degree as well as solidarity."

DIVISIONAL NEWS

NORTHERN DIVISION

Thirty-eight members attended the Spring Meeting of the Northern Division held in Newcastle upon Tyne on 19th March 1981. After the routine business, members heard a talk by Mr. R.W. Lander, Chief Environmental Health Officer, Middlesbrough B.C. on the Consultative Document: Revised Procedures on Smoke Control and the European Directive on Smoke and Sulphur Dioxide.

Mr. Lander first briefly described the requirements of the E.E.C. Directive as an understanding of this was necessary in order to comprehend some of the Government's proposals. He pointed out some of the anomalies that the proposed means of implementing the Directive introduced, for example areas where there had been no smoke control or monitoring, escaped without a mention, whereas other areas with progressive smoke control programmes had been blacklisted.

The revised procedures on smoke control, although at first glance appearing to give more freedom to individual local authorities, in fact Mr. Lander thought tightened the grip of the Ministry over financial arrangements. It appeared that to get the necessary exchequer contribution towards an Order, Councils would either have to be on the blacklist or have a partly completed ongoing programme. The chances of an authority who had not introduced any smoke control orders before being given the go ahead appeared slim.

Mr. Lander was thanked for his talk by the Vice Chairman, Councillor T.W. Yellowley.

C.R. Cresswell
Hon. Secretary

NORTH WEST DIVISION

On Tuesday, 17th March 1981, forty members of the Division enjoyed a Technical Visit to the Electricity Council Research Centre at Capenhurst, Chester. A varied programme was laid on including visits to workshops and laboratories to see projects under-going tests and terminating in two talks in the Lecture Theatre. Subjects selected for demonstration included fume control from metal melting; timber drying by heat pumps; effluent odour control by venturi aeration; odour control by ultra violet/ozone treatment and noise control from domestic heat pump installations.

Two particular projects, both available as commercial products, raised considerable interest amongst members. The control of odour from pig slurry on farms has caused concern in many areas and the method of venturi aeration has apparently proved to be effective in reducing the odour from such waste and stabilising it so as to allow the slurry to be spread on land close to houses without problem. The method is simple and relatively inexpensive and has been adapted to control a number of similar effluents.

The second project involved the melting of aluminium and brass alloys and similar metals by means of electric induction. The method of control enables the amount of fume and duration of fume emission to be reduced dramatically from these foundry processes. Divisional members commented on the fact that it may not be common practice to seek advice on such technical problems through the Local Electricity Board and yet the Research Centre obviously could assist with many such queries. Further information can be obtained from the Centre's Principal Commercial Manager, Mr. J.F. Marsh.

J.B. Douglas
Honorary Secretary

REPORT ON 1981 SPRING WORKSHOP

MONITORING – WHERE NEXT?

71 delegates attended the Workshop on Monitoring held at Henderson Hall, University of Newcastle upon Tyne. The delegates, from industry and local authority (elected members and officers), came from all parts of the UK although there was particularly strong support from the North. The Lord Mayor of Newcastle opened the Workshop on Wednesday 8th April, giving delegates a warm welcome to Newcastle which was reinforced by a very generous reception at the Mansion House that evening. The weather was also welcoming, with sunshine enhancing the attractive setting at Henderson Hall.

The subject under discussion was particularly topical in view of the recent DOE Circular 11/81 and the plans, announced in December 1980, to streamline the National Survey of smoke and sulphur dioxide. The authors of both the circular and the new National Survey were represented by Dr. Leslie Reed of the Department of the Environment and Dr. Alistair Keddie of Warren Spring Laboratory. Both presented papers at the Workshop which provoked lively discussion among the delegates about the future control and monitoring of smoke and sulphur dioxide in the UK. Representatives from local authority expressed concern about the publication of Annex F in the Circular which lists those areas likely not to meet the EC Directive on Smoke and SO2. It was felt that publishing such a blacklist took the pressure off other local authorities who were neither monitoring nor controlling air pollution at the present time. This was particularly a local concern with many mining villages in the north-east area still making widespread use of concessionary coal.

The other principal concern as expressed by speaker Mr. F.G. McQueen, was whether a national survey on a reduced scale would meet the needs of local requirements for control policy purposes. Mr. McQueen made a case for an extension, rather than a reduction in monitoring at local level. Both Dr. Keddie and Dr. Reed made it clear that the reduction in the number of monitoring sites, from the current level of about 1,200 down to eventually 150 sites would not be effected at once and that in the meantime there would be an additional quite extensive pattern of sites to meet the requirements of the EC Directive which would mean a total of 400-500 sites for the next few years. They also made it clear that the sites proposed for the future monitoring pattern would tend to be situated in the worst areas of pollution and would enable relative changes in urban smoke and SO2 for the whole of the UK to be monitored with an acceptable degree of accuracy.

The Wednesday afternoon session covered three different areas; first, liaison between monitoring organisations, the subject of a lively presentation by Mr. R. Emerson of Hartlepool Borough Council. He concluded that while complete liaison between all the various organisations undertaking monitoring is probably impossible to achieve, there are a number of important steps which can and should be taken to increase exchange of information and opinion between the various interested parties. Next, Mr. J.L. Jarvis, Manager of the Environmental Services Laboratory, Cape Industries Limited, reviewed the available instrumentation for monitoring particulate and gaseous pollutants which he supported with a comprehensive slide presentation. The paper and the presentation illustrated the main principles of the various techniques, and the wide range of instruments currently available to enable industrial hygienists and those concerned with the protection of the community to carry out air monitoring programmes. The last paper in the session was by Mr. Peter Sutton of Esso Petroleum Company Limited. His paper reviewed the impact of a major industrial complex, in this case the Fawley Oil Refinery and CEGB power station, Fawley, using the data given in the National Survey records. Southampton has particularly good coverage by Survey sites, some of which have been in operation since 1948. He showed that it was possible, using solely the data taken from the annual reports of the National Survey together with an ability to do sums and considerable patience, to make a very effective assessment of the impact of particular sources without using any computer aids.

Two papers were presented at the session on Thursday morning, by Jerry Giltrow of H.M. Alkali and Clean Air Inspectorate on "Heavy Metal Surveys" and by Dr. Mike Schwar of the Greater London Council, on Monitoring and Measurement of Pollution from Road Vehicles. Mr. Giltrow considered the monitoring of a range of heavy metals but paid particular attention to lead. Recent surveys of environmental lead have highlighted gaps in the knowledge of emissions of particulates from low level sources at leadworks. In the discussion, Mr. Giltrow emphasised that with heavy metals in general and lead in particular it simply was not good enough to know what a works was putting out of its chimney and that use of Part IV of the Control of Pollution Act would not really be worthwhile. Other, particularly low level, sources were far more significant as chimney emissions were tightly controlled.

Dr. Schwar explained the Greater London Council's work in meeting its varied responsibilities as a strategic planning authority, a highway authority, a traffic management authority, a licensing authority and an employer. The GLC take their responsibilities one step beyond that of monitoring and consider the effects of the pollution on the environment and on people's attitudes. Arising from this, the Greater London Council set their own air quality guides or objectives which in some cases are lower (more stringent) than those of the World Health Organisation. Again with reference to lead, he explained that the GLC, having found high levels of lead in dust, had set their own guideline of 500 ppm.

The final session at the Workshop was a general discussion on the whole topic of monitoring and tackled issues which had arisen from the earlier discussions. The Workshop, very ably chaired throughout by the Society's Chairman, Mr. A.J. Clarke, had been planned to allow ample time for discussion of the individual papers at the end of each session. However, in order to enable the general discussion to flow as freely as possible, Mr. Clarke arranged a "Question Time" travelling microphone which he passed among the various delegates in the auditorium to give as many people as possible a chance to air their views and have immediate answers from speakers. This procedure worked well and encouraged active debate of contentious issues.

The proceedings at the Workshop are published and are available from the National Society for Clean Air, price £6 (papers and published discussions), 65p per individual paper. Prices are inclusive of post and packing charges.

REDUCTION IN LEAD CONTENT OF PETROL

The Government announced on May 11, that the maximum permitted lead content in petrol will be reduced from the upper limit (permitted under Article 2 of EEC Directive 78/611 concerning the lead content in petrol) of 0.40 grammes per litre (g/l), to the lower limit of 0.15 g/l. This limit will be introduced "not later than 1985". In his statement to the House of Commons announcing this decision, Mr. Tom King, Minister for Local Government and Environmental Services, declared that the measure would "reduce by about two-thirds lead emissions from cars some 10 years earlier than any other practicable method".

This measure will also be an important step in achieving the air quality standard for lead of 2 micrograms per cubic metre proposed in the EEC draft directive on air quality standards for lead. This level of acceptability was endorsed by the Lawther report on the health effects of environmental lead pollution and agreed by the UK government.

Germany is the only EC member state which has so far introduced a maximum limit of 0.15 g/l, which it did in 1976. However, Denmark is planning to move to the same level in 1982/83. Outside the EEC other European countries which have made, or are planning to make, similar moves are Sweden, which has already imposed a limit of 0.15 g/l for regular grade fuel which will be extended to premium grade from July of this year, and Norway and Switzerland which both propose a 0.15 limit for all petrol from 1982/83. The Community's directive sets out the lowest level of lead content that can be established by governments, but this would not preclude petrol companies from offering even purer grades.

In the United States, lead-free petrol was introduced in 1974 since when new cars on the market have had to be designed to take lead-free fuel. 50% of US cars, however, which are those sold before 1974, still take leaded petrol.

Assessment of Nuisance from Deposited Particulates Using a Simple and Inexpensive Measuring System

A.L. Beaman and R.W.S.M. Kingsbury
Atkins Research and Development

This paper is a supplementary to those presented by Atkins Research and Development at the one day Seminar on Air Pollution Assessment and Control, Bolton, 15 April 1981. The Seminar was organised by the Manchester Area Council for Clean Air and Noise Control, in conjunction with Atkins Research and Development.

Introduction

Arising from the increasing need to monitor and assess nuisance for deposited particulates, and the apparent lack of a suitable practical method, the authors have developed the following system. It represents the result of several years of development trying different methods and materials.

Materials and Equipment

- White CON-TACT self adhesive surface covering — available from Woolworths and most hardware shops
- 8 inch square hard-board backing boards
- Roasting wrap transparent film — available from Boots the Chemist and other hardware shops or CLING FILM or clear lacquer aerosol
- Masking tape or sellotape
- Scalpel or sharp knife
- Smoke stain reflectometer as used in The National Survey of Smoke and Sulphur Dioxide

Method

Preparation

The CON-TACT is cut into 6 inch squares and placed onto the backing boards with the protective peel-off layer upper most. One corner of the peel-off layer is turned back about ¼″ and the corner is fastened down to the board with masking tape as indicated in Figure 1.

The other three corners can be fastened down without turning back the protective layer. With a scalpel or sharp knife at the centre of the CON-TACT a cut is made to the centre of a side which does not have a corner turned back. Initially the cut should be deep, becoming shallow almost immediately. Thus only the protective layer is completely cut through.

Another cut is made from the centre to the mid-point of the other side without a corner turned back.

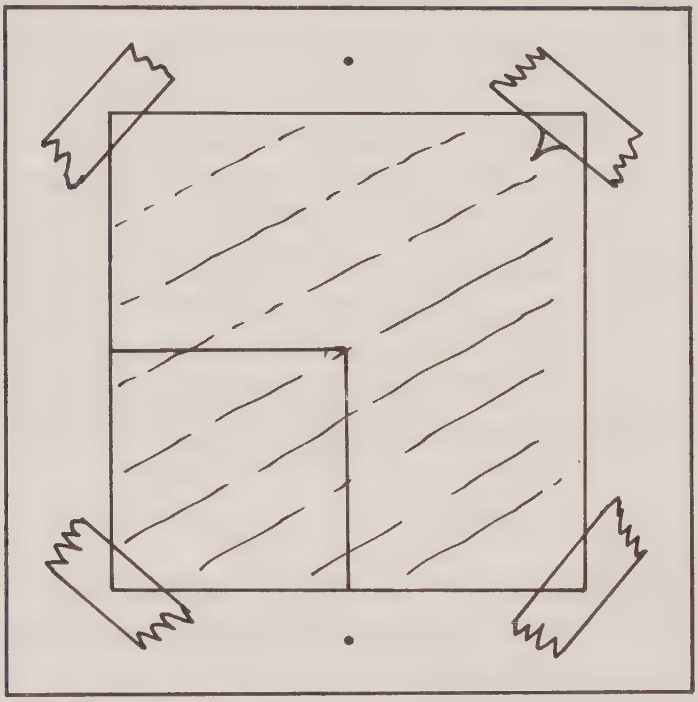

Figure 1

Use

On location the sticky pad (with backing board) is fixed to a suitable surface to prevent it from being blown away. On the ground this can be achieved by pushing nails through holes on opposite sides of the backing board. When fixed in place ¾ of the protective backing paper can be removed exposing an L-shaped sticky surface. Care should be taken not to remove the small remaining square of protective backing. A note should be made of the date and time that the sticky surface was exposed. The pad is then left from 3 to 48 hours depending upon the dust deposition rate.

Collection

After the exposure time the small square of protective backing is removed and the whole sticky pad is covered with a transparent film or sprayed with clear enamel to prevent further pick up of particulates. A note should be made of the time that the sticky pad was recovered.

Analysis

A smoke stain reflectometer is used to measure the reduction in reflectivity of the exposed surface with reference to the unexposed control surface. The percentage obscuration or effective area coverage (EAC) of the dust is then obtained by subtracting the measured percentage reflectivity from 100. The EAC obtained must then be adjusted to give the equivalent value over one day.

Assessment

The daily effective area coverage can then be compared with

- Table 1, typical deposition rates found in various situations, and
- Table 2, public response to various deposition rates

These levels and criteria have been derived from extensive work carried out by Carey, Hancock, Shillito and others.

Table 1. TYPICAL LEVELS FOUND BY AREA

% EAC/day	Situation
0.01	rural
0.02	suburban/small towns
0.3 – 0.4	urban
0.5	rural summer time
0.8 – 1	industrial

Table 2. PUBLIC RESPONSE TO DIFFERENT COVERAGE RATES

% EAC/ day	Public Response*
0.2	noticeable
0.5	possible complaints
0.7	objectionable
2	probable complaints
5	serious complaints

* depends on colour and type of dust

Effects of Climatic and Other Variables

Rain

It is preferable not to measure over rainy periods. Rain affects the transport of dust in the air, although it does not appear to greatly affect collection. In addition, problems can be experienced when covering the exposed surface with film or lacquer.

Covering for exposed surfaces

There is little variation in the obscuration reading when using different surface coverings. When using transparent film to cover the exposed surface, it is preferable to remove any wrinkles. These can affect readings by allowing external light to pass under the reflectometer head.

Automobile spray lacquer produces an excellent finish, but takes about 5 minutes to become touch dry. If lacquer is used, it is useful to have a rack available in which the sample can be placed to dry while being transported.

Length of exposure

Although 3-48 hours is quoted in the text, the exposure period can be as long or as short as necessary. From experience, it has been found that

- the pad should not be loaded to more than about 50% obscuration (very rarely happens)
- if there is not a visible deposit then it will not be measurable on the reflectometer — the sample collection time should be extended.
- although the stickiness of the surface does not appear to diminish over a few days, the longer the sample is out, the greater the chance that it will become vandalised, lost, or blown away.

The method described for measuring the dust deposition rate uses inexpensive and readily available materials and yet is very sensitive; measurable deposits can be accumulated in a few hours.

By employing such an inexpensive monitoring system, a large number of samples can be taken. This allows improved accuracy around the source without incurring excessive costs. The loss or damage of a few samples through vandalism is more inconvenient than expensive. The technique also allows the collection of permanent records for visual comparison/assessment and identification of type of dust using a microscope.

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INDUSTRIAL NEWS

F.E. Beaumont Limited, the Industrial Steel Chimney Specialists have announced the appointment of Nicholas Beaumont as a Director with effect from 1st April 1981. Nicholas will continue to be actively associated with sales as the Manager of that department.

Reader Enquiry Service No. 9015

Hybrid Systems Can Halve Fuel Costs — with no Road Tax to pay

While we are waiting for advances in batteries, there can be fuel savings of between 50% and 70% through the use of hybrid electric vehicles. Vehicles using this system are also licensed as electric, so there is no road tax to pay.

The first international conference on this subject, which will include a demonstration of hybrid vehicles, is to be held in London on the 15th - 16th September 1981. The meeting will be in the series of international events organised by the ELECTRIC VEHICLE DEVELOPMENT GROUP and will be entitled "Hybrid, Dual Mode and Tracked Systems". London Transport has made its testing grounds available for the purpose of showing the capabilities of a number of vans, cars and a public passenger vehicle, which will incorporate a new British hybrid system to be seen for the first time. In this system, a small engine drives a generator which charges the batteries. No fuel is wasted as the engine is run at a constant optimum and even the energy used for braking is partly recouped and stored. The first monitored results will be given by the operators who are introducing these vehicles to their fleets.

At the meeting the latest hybrid systems from all parts of the world will be discussed. America has an active Government sponsored programme with hybrid cars as well as several projected with flywheels, which conserve energy. Germany and France are also in the forefront of this new technology and will be contributing to the event. The present generation of hybrid vehicles is still fuelled by oil, but this is an intermediary stage. Sweden and Belgium are developing prototypes which could be powered by hydrogen or methanol.

Dual mode vehicles are also powered largely from another conventional fuel supply, that is electricity from rail or overhead supply. The use of a small diesel engine or battery can allow such vehicles to run independently from their track and make them more flexible. Trolleybuses can operate off the overhead wire and for the future, a dual mode system is being tested which is embedded in the road surface and powers vehicles, while at the same time guiding them to their destination.

As oil prices rise there will be increasing markets throughout the world for fast inter-city transport. There is also a growing requirement in urban centres for rapid passenger transit, and the latest technological advances here will be reviewed.

Reader Enquiry Service No. 9016

Tolltreck Lead Recycling Smelter Commissioned in France

A secondary lead smelter and refinery designed as an integrated system to meet stringent environmental requirements has been supplied and commissioned by Tolltreck at the new French battery plant of Delco Remy, Division of General Motors.

The clean recycling of lead-rich factory scrap is of major significance at the Delco Remy factory at Sarreguemines in Alsace, where lead-tin-calcium grid alloy is used in the production of maintenance-free vehicle batteries.

Up to 25 tonnes of lead bullion per day can be produced with exceptionally low workplace and stack emissions. This has been achieved through Tolltreck's specialist environmental engineering approach concentrating on the reduction of fugitive emissions and the encapsulation of the remaining sources.

The smelter exhaust and ventilation gases are mixed, conditioned and filtered in high efficiency bag filters prior to clean discharge to atmosphere.

The refinery can produce 25 kg pure lead ingots for oxide production, 1 tonne grid alloy hogs and 25 kg antimonial lead ingots. The smelter will recycle all filter dust and drosses and the only site discharge will be a slag with around 1% lead.

Under the £850,000 contract Tolltreck supplied all process equipment for the recycling facility and supervised the construction and start up. The integrated system design was based on the Tolltreck Rotaflux 3 metre short rotary furnace and three Tolltreck Finex 20 tonne refining kettles.
Reader Enquiry Service No. 9017

Explaining radiological protection: new booklet 'Living with Radiation'

The NRPB has published a new version of its booklet 'Living with Radiation' (HMSO, 50p). It is written to stimulate interest in the principles and practice of radiological protection.

The objectives of the new booklet are to describe for general readers the nature of ionising radiation, its sources and effects, and the means of protecting people against it.

The biological effects of radiation have been studied for several decades and regulations to protect health exist in most countries. Over the years the relationship between radiation dose and the risk of harmful effects has become more firmly established. For the purposes of radiological protection, it is considered prudent to assume a linear relationship between risk and dose, with no threshold below which there is no risk even at very low doses.

This means that any level of radiation, whether in factories, hospitals and colleges, or associated with consumer goods or the generation of electricity by nuclear reactors, is assumed to carry with it a risk borne by individuals and society. It is inevitable, therefore, that radiological protection should be a matter of public debate. Indeed, at the heart of radiological protection is the ethical difficulty of deciding whether radiation risks are worth incurring and how they should be spread throughout the community.

In the new booklet, information is presented in such a way as to help readers to make their own judgements of the issues.

The complexity of radiological protection, embracing, as it does, aspects of medicine, engineering, statistics, law, public administration and several branches of science hinders public participation in the debate. A number of abstract concepts and quantities have been introduced in recent years which must seem unduly obscure to outsiders; an attempt is therefore made early in the booklet to explain essential terms, and a glossary is also provided.

There is more public concern about exposure from artificial radiation than from natural radiation. The irony is that for the average person exposure from the latter considerably exceeds the former, although this has no bearing on the need to limit artificial exposure. The booklet identifies sources of both types of radiation and summarises doses to individuals and to the population.

In a survey of radiation effects, risk factors for malignant diseases and hereditary defects are presented, and the strength of the supporting evidence is examined. The use of these risk factors in the overall system of dose limitation is considered next, and this may raise questions in the minds of readers. Is the system just and fair? Is the right balance reached between individual and social interests?

Two of the subjects that cause most public anxiety are nuclear reactors and radioactive wastes. These are treated separately, but in a similar manner: the nature of reactors and wastes is described, the associated hazards are explained, and the practices and prospects for safety are outlined. Society's requirements are recognised, and the need to rely on scientific skill to meet them is stressed.

Further information is available from the Information Officer, National Radiological Protection Board. Telephone: Abingdon (0235) 831600, Ext. 410.

Reader Enquiry Service No. 9018

Government Announces Consultants for CHP/DH Studies

The Government is to appoint consultants to carry out market and engineering surveys in the nine areas to be examined during the next phase of its Combined Heat and Power / District Heating (CHP/DH) programme, Mr. John Moore, Parliamentary Under Secretary of State for Energy, has announced. This work will include market and engineering surveys to be carried out by consultants. The Department has appointed Research Surveys of Great Britain Ltd to carry out the market survey work in all locations, and subject to the satisfactory conclusion of contractual negotiations, intends to appoint the following consultants to carry out the engineering studies: Belfast — Pell Frischman & Partners; Edinburgh — Douglas MacKenzie & Partners; Glasgow — CHP Group Consultants; Leicester — NIFES; Liverpool — CHP Group Consultants; London (East/Central) — Orchard Partners; Manchester — Donald Smith, Seymour & Rooley; Sheffield — NIFES; Newcastle/Gateshead — Merz and McLellan.

Reader Enquiry Service No. 9019

OBITUARY

Commander Colin Buist CVO, who died on May 19 at the age of 85 gave many years of service to the National Society for Clean Air. He was a long-standing member of the Society's Council and was made Vice President in July 1975.

He represented the Low Temperature Coal Distillers Association on the Executive Council. During this period he was Chairman of Coalite and Chemical Products Ltd and was President of the Coalite Group on his death.

Commander Buist served on the Executive Committee of the Solid Smokeless Fuels Federation as an active member for 25 years and as an honorary member for 3 years.

He was born on April 10 1896, the son of Colonel F B Buist and educated at the RN Colleges Osborne and Dartmouth. At Osborne he was a member of Grenville Term and so was Prince Albert. Commander Buist became one of the Prince's circle of intimates and later when the Prince became Duke of York Commander Buist was appointed his equerry. He served the Prince of Wales with whom he was on warm terms in a similar capacity.

He returned to the Duke of York's service when the Duke became King George VI and was with him until his death. From 1952 he was Extra Equerry to the Queen. He was on active service in both world wars. He was made MVO in 1927 and promoted to CVO in 1961.

THE BRACKNELL NO. 7 & 8 SMOKE CONTROL (REVOCATION) ORDERS

The Department of the Environment has turned down the application by the Bracknell District Council for confirmation of the above-mentioned orders. Clean Air, Volume 11, No. 1 (page 31) reported inaccurately that these orders had already been revoked. In fact the Department of the Environment took a very long time to come to a decision and after carefully weighing the facts and arguments on which the Secretary of State originally confirmed the two principal orders, judged against that the Council's case for revocation. It was considered that there had been no real shift in the balance of arguments despite the decision taken at local level to abandon the smoke control programme for the Sandhurst and Crowthorne areas.

ESTABLISHMENT OF SMOKE CONTROL AREAS

CLEAN AIR ACT 1956, SECTION 12(2)

Recently, a Stipendiary Magistrate allowed an appeal against notice served by a local authority on an owner under the Clean Air Act 1956, Section 12(2). He held that the notice should have been served on the occupier, in this particular case the tenant, to carry out the necessary adaptations to the fireplaces to burn smokeless fuel. That decision was at variance with the policy adopted by the local authority and also at variance with a case reported in Smokeless Air, Winter 1960, when Warrington Magistrates Court dismissed a similar appeal and the owners were ordered to carry out the adaptions to the fireplaces within 28 days. The Society would be pleased to hear from any other local authority (a) what their policy is in such circumstances, e.g. whether they serve notice on the owner or (b) any detail of similar cases and decisions made on appeal.

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CLEAN AIR

VOL.11 NO.3

NATIONAL SOCIETY FOR CLEAN AIR FORTHCOMING EVENTS

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CLEAN AIR

THE JOURNAL OF THE NATIONAL SOCIETY FOR CLEAN AIR

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Technical articles of full page length, or over, in CLEAN AIR are indexed in Current Technology Index. Abstracts are included in Environmental Periodicals Bibliography (EPB).

PUBLIC POLICY AND PRIVATE CHOICE

The three year's work of the Commission on Energy and the Environment is enshrined in its first, and last, full report 'Coal and the Environment'. This tour de force has had a limp public reception, with low key comment in the press, and priced at £23 it is unlikely to reach a mass readership. Various members of the Government, the energy industry and the enforcement agencies will doubtless read and digest the Commission's 70 or so conclusions and recommendations. But to the public at large the media message has been brief and will soon be forgotten — the coal industry can expand without dooming us to the environmental problems of the past.

However, the report deserves wider dissemination and public debate. Throughout the analysis of technical and scientific matters related to the coal industry, there is in the report a common-sense approach to problems, such as subsidence, which affect the individual. Indeed, anyone affected personally by coal mining operations or by air pollution associated with coal combustion will come to very different conclusions about the balance of benefits and disadvantages associated with coal winning and use than will Government or industry. While the viewpoints of environmental groups and concerned individuals were an input to the report, a far wider output in terms of public education is required to ensure general understanding of government policy towards development of the coal industry — which this report will presumably influence — and the conflict of interest which lies behind any national energy policy. Individuals should be able to appreciate the benefits and disadvantages of coal use options through access to the best available information. Greater public discussion of a whole range of subjects and issues covered in this report should be encouraged both locally and nationally, so that at the very least individual consumers will be alive to the environmental implications of their own domestic fuel choice.

MEASUREMENTS OF ENVIRONMENTAL LEAD – THE PROBLEM OF REPRESENTATIVE SAMPLING

M.J. DUGGAN
Environmental Sciences Division, Scientific Branch, Greater London Council

The ideal sampling programme is the smallest one that will give representative results, but it is often difficult to decide how few measurements one can make do with. When making the decision for any particular investigation it is useful to have some idea of the temporal and spatial variations in concentration that are likely to be encountered.

The hazard from exposure to environmental lead is usually a long-term one and so is best judged from a knowledge of the levels of airborne lead and and lead in dust averaged over a lengthy period – months rather than days. This is reflected in the form of the current guidelines and standards for environmental lead. For example, the GLC guidelines for airborne lead and lead in dust(1) are in terms of 3-month averages, the draft EEC standard for airborne lead in residential areas(2) is a mean annual concentration and the U.S. Environmental Protection Agency's standard for airborne lead(3) is the mean value over a calendar quarter. The GLC and EEC reference levels for airborne lead imply continuous sampling throughout the total period, while the USEPA specify a minimum sampling frequency of one 24 h sample every six days.

For air sampling, any departure from continuous monitoring throughout the period specified in the reference level will result in an error the size of which is likely to increase as the total sampling period decreases. There is some regular seasonal variation in airborne concentrations for which allowance can be made. For example, at our County Hall site close to a major road, the concentration during the winter months (October - March) is usually a factor of about 1 - 2 higher than that during the summer months (April - September); this is presumably due to the greater atmospheric stability during the winter. It is worth noting that this effect increases with distance from the source – at one rooftop site the factor is about 1.5, while at a kerbside site it is close to unity. However, in general, there is no escaping the fact that sampling for just 3 or 4 weeks may give a result substantially and unpredictably different from the long-term average. For example, the average weekly (168 h) concentrations at one of our roadside sites in 12 consecutive weeks were 1.0, 0.8, 0.6, 0.7, 1.2, 1.6, 1.0, 1.7, 1.6, 1.3, 0.9 and 2.7 ug/m^3; the overall average of these is 1.3 ug/m^3 while the average over the first four weeks is only 0.8 ug/m^3.

The concentration of airborne lead in a street over a 24 h cycle usually shows a strong correlation with the pattern of traffic flow, with ''daytime only'' concentrations typically about twice the 24 h average concentrations. It would of course be quite misleading to compare ''daytime only'' values with reference levels which are specified in terms of continuous (24 h per day) exposure over a long period.

There is little information about the temporal variation of lead in dust concentrations. We have recently been collecting a sample of dust each week from the same area of a pavement near the County Hall. During nine consecutive weeks the concentrations ranged from 1500 ppm to 4500 ppm with an average value of 2800 ppm, and so (at least at this particular site) sampling on a single day could give a misleading result.

The investigator has to contend with spatial as well as temporal variations.

As regards airborne lead, the draft EEC standard for residential areas requires the sampling station to be more than 50 m away from roads with heavy traffic (defined as a daily average of 12,000 vehicles/24 h) and between 1.5 and 10 m above ground level. The Lawther Report(4), in its recommendation of the same figure as proposed by the EEC, puts it in the context of ''places where people are likely to be continuously exposed for long periods'', and a similar phraseology is used in the GLC guideline. The USEPA defines three type of site — roadway, neighbourhood and street canyon — and gives a detailed specification of monitoring location for each; e.g. for the ''neighbourhood site'' the sampling point should be at least 15 m from the nearest road with more than 2000 - 3000 vehicles/24 h, and monitors should not be more than 5 m above ground level.

Clearly, there is no general agreement as to where samplers should be sited and, until there is, a comparison of the numerical values of airborne concentrations obtained by the different investigations may not be very meaningful. For example, the ratio of concentrations at the front and rear facades of a modestly high (say 3/4 storey) run of buildings in a city street is typically about 2 : 1, and at an open site the same ratio of concentrations could be expected at distances of about 1 and 10 m from the kerbside.

While for airborne lead there is some guidance (albeit conflicting) as to monitoring locations, for lead in dust there is virtually none. There is also a lack of published data about the spatial variation in concentration likely to occur within a limited area. In a recent study of our own, we took 30 samples from a school playground (of area about 3500 m^2) on one day. The sampling points were spaced on a 10 m grid; there was no lead works or major road nearby. The concentrations found ranged from 250 to 2200 ppm with an average value of 700 ppm. Once again, it is evident that the taking of just 3 or 4 samples could give a misleading result.

Lead is a ubiquitous material and in any programme of lead in dust measurements it is not unusual to find occasional, atypical, high values. The effect of these is likely to be most pronounced if only a few, small-volume, samples are taken, and if the arithmetic mean rather than the geometric mean or the median is used to express the overall value.

The most important conclusion to be drawn here is probably that there is a need for some uniformity in sampling regimes if the results of different investigators are to be compared, or if the results of any one investigator are to be compared with a reference level. Present practice, in this country at any rate, is far from uniform and is unlikely to become so without some authoritative guidance.

This note is concerned only with the effects of spatial and temporal variations on the numerical values of concentration reported by the investigator. There are of course other influential factors (e.g. for airborne lead, the design of the sampling head; for lead in dust, the mesh size at which the sample is sieved prior to analysis) which need to be taken into account.

The need for uniformity is a general one, covering most aspects of sampling and subsequent analysis.

REFERENCES

1. Greater London Council: Joint Report of the Recreation and Community Services Policy Committee and the Planning and Communications Policy Committee, "Guidelines for the Assessment of Lead Pollution", 16 February and 11 March 1981.

2. Commission of the European Communities: Proposal for a Council Directive (EEC) on Air Quality Standards for Lead, COM(75) 166, 1975.

3. US Environmental Protection Agency, Federal Register, **43(194)**, 4 6246-77, 1978.

GUIDANCE ON CONTROL OF LEAD AT WORK REGULATIONS PUBLISHED.

The Health and Safety Executive have published acceptable techniques and strategies for measuring concentrations of lead in air in the work place. The guidance* relates to certain requirements of the Control of Lead at Work Regulations 1980 which came into effect on 18th August 1981. The regulations and the supporting approved code of practice apply whenever anyone at work is exposed to lead in a form which can be taken up by the body.

* *Guidance Note EH28, Control of lead: air sampling techniques and strategies. Health and Safety Executive, August 1981.*

National Society for Clean Air Annual Conference, Brighton 1981

Opening Session – Monday 5 October

Speech by THE EARL OF AVON, House of Lords Spokesman on the Environment, Transport and the Arts.

I am extremely pleased to be here this evening at the opening of your Annual Conference, particularly as this year marks the 25th anniversary of the first Clean Air Act. I hope you will not feel it impertinent if I lay claim to some small family credit for that initiative in 1956. My father, then Prime Minister, was a convinced supporter of the Clean Air Act.

We can all be justifiably proud of the improvements in air quality made in the last quarter of a century, and members of this Society, both in a corporate, and individual way, have been leading contributors to those improvements. There will be lasting benefits to the health and cleanliness of this country, and now that the worst conditions of smog and smoke are becoming little more than a fading memory, it is tempting for people to think that nothing remains to be done. This as you know is not the case. Not only must we continue with the visible improvements but we must safeguard the progress that we have already made.

May I reflect a little on how we arrived at the present situation.

It may seem strange now to be marking a 25th anniversary when, as was remarked in 1973, we should then have been celebrating the 700th anniversary of the beginning of the struggle against air pollution. But the fact is that despite repeated attempts down the centuries to deal with various problems of air pollution it is only now that we are, for instance, in a position to mark a substantial period of real success in dealing with the widespread problem of smoke.

The great period of industrialisation and urbanisation in the 19th Century considerably aggravated the problems of air pollution. These did not escape the notice of the great public health reformers and certainly in relation to industrial emissions the basic solutions in terms of legislation and a philosophy of control were devised then. But even though the Public Health Acts helped it was not until the end of the century that the more widespread problem of coal smoke began to be effectively tackled. Your forerunners in the Coal Smoke Abatement Society, and later the Smoke Abatement League were instrumental in beginning the detailed process of monitoring and analysis that provided a sound foundation on which legislative progress could be made. In the event, although committees met and pieces of legislation were passed it took the dramatic events of 1952 in London to bring home to Parliament the need for legislation on a national scale.

Even when the need is so clear, legislation is rarely an easy or quick process but by 1956 the Clean Air Act was passed. It is primarily through the progressive designation of smoke control areas under that Act that we have secured the substantially clean air we know today.

Of course we were comparatively lucky in that a range of technological changes took place at the same time; the conversion from steam to diesel and electric locomotives on the railways, the trend towards using oil, gas and electricity for heating, and improved technology for the combustion of solid fuels, all these have lightened the burden of bringing about the necessary changes. But some of these trends could turn against us; North Sea gas will not be with us forever and in determining the probable energy balance for the future, pollution considerations can sometimes be overtaken by wider economic forces.

So much for the demonstrable success of the past. What of the future? In contrast to 1956 we are now more conscious of the "environment"; indeed we now have a substantial Department named after it, and Michael Heseltine and all my colleagues there are keen to see it make a positive contribution to improving all aspects of the environment. The European Community is now an important feature in our deliberations on environmental matters. We are, to everyone's benefit, adopting common policies over wide areas of the environment including the control of air pollution.

The Government believes that the sensible way to do this is to concentrate on devising standards for air quality and, as you are well aware, we have recently agreed the first directive specifically setting up air quality standards — in this case for smoke and sulphur dioxide. This gives the Government and local authorities a strategic framework within which to consider the progress we have made in improving air quality and to identify those areas where further improvements may be necessary. Some more smoke control is needed in some areas; in others we may need to look particularly at sulphur dioxide emissions and perhaps control these through regulations on the sulphur content of the fuel oil.

We are looking forward to the cooperation of local authorities in bringing everywhere up to the standards required by the Directive as quickly as we can given the available resources.

Another area of considerable interest recently is pollution from lead. The problem here stretches well beyond air pollution alone and Professor Lawther, as you know, one of your distinguished past presidents of the Society, conducted a most helpful review for us on all aspects of environmental lead and health.

The Government is proceeding to implement most of the recommendations made by Professor Lawther's committee including in particular a reduction in the lead content of petrol. This will enable the UK to comply generally with the proposed air quality standard for lead. The UK, as President for the time being in the Community is pressing forward with the proposal for a directive incorporating that standard.

One priority for the immediate future must be to ensure that there is no return to the dreadful air pollution of the past. This means taking careful note of what the Commission on Energy and the Environment have had to tell us and seeking to ensure that our legislation is adequate to deal with the problems that are arising as well as with the problems for which it was originally designed. If there should be need to take specific action on other pollutants we will increasingly be adopting an air quality approach although some careful thought is needed to ensure that we continue to reap the benefits that the pragmatic improvements from "the best practicable means" approach has brought us.

In trying to look further forward to what the next 25 years will bring, it is probably fair to assume that there will not be the same degree of visible progress as over the last quarter century. I stress "visible". I am highly conscious that I am speaking not only to the converted but to the expert and I think one sometimes needs to reflect on what the average man in the street thinks of as air pollution. Generally it is things that he can see, like dirty black smoke from an industrial site, or else things that affect him in some tangible way, like smells, and these will still have to be dealt with.

The more sophisticated chemical pollutants with which both you and my Department are more concerned do not receive quite the same type of attention; although the interest in lead suggests that the general public is increasingly sophisticated and able to express a desire for action on these more complex topics.

In considering these more subtle problems of the future the Government sees the National Society for Clean Air continuing to play the important role it has played in the past.

Government has, over the last 25 years, recognised the need to be closely in touch with outside expert opinion on all matters concerned with air pollution. This has been done in a variety of ways but running through all of them you will find one consistent thread; advice from, and representations by, members of the National Society. This advice has always been particularly valued because it comes from a body with an extraordinary range of interest which extends from local authority representatives through the professional environmental health interests, covers industry also and includes scientists, academics and of course the public at large.

We value the continuity of effort over the years, the consistency and integrity of the Society's purpose and its approach that reflects the need to maintain a carefully considered balance between reducing pollution and the economic health of industrial and commercial activities. We welcome too the continuing broadening of the Society's interests beyond air pollution to cover noise and other matters.

To describe people as a "Pressure group" sometimes sounds almost like an insult in government circles; but I can assure you the Society is never thought of as other than a helpful organisation.

No doubt you will always be applying pressure to us in one way or another — that is part of your role in life — but I hope you will feel, as we do, that there is a constructive aspect to such a relationship in which we can seek views from you about the issues of the moment and know that the views expressed by the Society are the results of debates in a forum that spans all the relevant interests.

Everyone here can look back on the achievements of the past 25 years in creating cleaner air as an example of the constructive cooperation between all those involved that is the best way to tackle such problems. I am sure we can look forward to the continuation of that cooperation in the future.

COAL AND THE ENVIRONMENT

The eagerly awaited report on the coal study conducted by the Commission on Energy and the Environment (CENE) was published at the beginning of this month. The Commission has been working for three years on their examination of the longer term environmental implications of future coal production, supply and use in the UK, looking to the period beyond and around the end of this century. Reaction to the publication of the report in the media has been fairly low key, with the emphasis on the Commission's concern about opencast mining and disposal of spoil. In her presidential address at the Opening Session of the Society's 1981 Conference, the NSCA's new President, Naomi McIntosh, a member of CENE, provided some insights into the way the Commission had approached their study. She said that the Commission had soon become convinced that energy policy could not exist in isolation but involved industrial, commercial and social as well as environmental issues and that one of the great benefits of the Commission's work was that it had drawn together evidence and opinions from representatives of all sectors of the energy industry and 70 other organisations and individuals. The Commission did not meet in public but it encouraged publication of the evidence submitted to it, so that its work and the basis for the final report could be more open to public scrutiny. This attitude and the very comprehensive nature of the study have produced in this report a grand scale environmental impact assessment, based on most careful briefings by all interested parties.

The Commission concluded that, apart from opencast mining, the worst features of the coal industry are associated with the inheritance from the past. Future developments, with careful use of best techniques and practice to prevent hazards and environmental degradation, make for a "hopeful future".

The coverage of likely impact on air quality of increasing use of coal, particularly by industry, is comprehensive although hampered in parts by lack of conclusive scientific evidence on such issues as long range transport of air pollution and build-up of carbon dioxide in the atmosphere. While the Commission considers that industrial coal burn can be positively encouraged in most circumstances, it emphasised that local authorities in particular should be aware of and prepared for a possible quadrupling in industrial coal use by the end of the century. There might be a cumulative build-up of multi-source pollution in some areas which, at the very least, will require careful monitoring to be carried out to ensure that levels of pollution can be kept within safe limits. Further, the

Commission recommends that central government should consider the possibility of empowering local authorities to require prior consent to an industrial choice of fuel or means of controlling emissions and of extending the best practicable means approach to those processes controlled by local authorities. This recommendation is in line with the views expressed in the 5th report of the Royal Commission on Environmental Pollution, also chaired by Lord Flowers.

As for domestic use of coal, the Commission is more in favour of smoke-reducing appliances than the further development of solid smokeless fuel. "The manufacture of smokeless solid fuel from bituminous coal is expensive, and can cause severe pollution at the point of production." The report recommends that the performance of smoke-reducing appliances and they effect they have on ambient smoke levels should be carefully monitored and concludes that more efforts must be made to develop and market smoke-reducing appliances which are reliable and foolproof under all conditions of use.

Commission on Energy and the Environment. Coal and the Environment. HMSO, October 1981, £23 net.

NEW CHIEF INSPECTOR OF NUCLEAR INSTALLATIONS

The Health and Safety Executive has appointed Mr. Ron Anthony as HM Chief Inspector of Nuclear Installations and Director of the Hazardous Installations Group from July 1, 1981. He will transfer from his present post as head of the Executive's Safety Policy Division, on the retirement of the present Chief Inspector, Mr. Ron Gausden.

Mr. Anthony's responsibilities will include the formulation of policy in respect of the safety assessment and licensing of nuclear power stations, both operating and under construction, fuel processing and waste management, and the PWR review. In addition he will be responsible for the Executive's hazardous installations policy branch and the major hazards assessment unit.

MANCHESTER AREA COUNCIL FOR CLEAN AIR AND NOISE CONTROL

At its recent Annual General Meeting, the Manchester Area Council for Clean Air and Noise Control elected as Honorary Associate Members, Mr. Sam Pepperman, Sir Robert Thomas, and Professor P.J. Lawther. Mr. Pepperman was the Council's first Chairman. Sir Robert Thomas was a member of the Manchester City Council for many years and played an important role in developing clean air policies. Additionally, he has served local government as Leader of Manchester City Council, the Greater Manchester Council, and the A.M.A. Professor Lawther's involvement in clean air is well known, and he has been of considerable help to the Council.

PILOT'S LICENCE

Having been your Secretary General for almost a year I am increasingly feeling twinges of guilt over not yet having made a proper contribution to this journal. The reason for this is, of course, that unless one has something to say that others are likely to find worth reading common sense says that one should keep quiet. This puts me on the spot — since I am now asking you to presume that what follows is of interest! At any rate, I am going to presume on your good natures that my first contribution to *Clean Air* will be read with the same indulgence that new members of the House of Commons traditionally receive when they first hold forth in that place.

Despite my year in office I still do not know very much about Clean Air, nor do I imagine that you think I should. Nor do I think that I shall ever catch up with those who have spent a lifetime in the business, though I shall try to do my best. What I have learned is that if you are going to talk about clean air and noise control it is vital to get ones facts right: on highly technical subjects it is no use trying to get by with a bunch of waffle. This came home to me a few weeks ago when I was being interviewed for television news by a reporter who, though a kindly and nice gentleman, had I suspect garnered his questions from a Warren Spring Report. Well, as the Secretary General of the National Society for Clean Air it may be perfectly reasonable to say "I don't know" once or even twice, but the third time I knew that viewers would be questioning the credibility of the Society. In the event reputations were preserved as that bit was cut from the tape. As I said, my interviewer was a gentleman!

An interesting point about the interview, which was seeking the Society's views on a call by some good citizens of Epping Forest for the revocation of a smoke control order, was that the camera team had spent two days looking around London for a smoking chimney to use as a backdrop, and had been unable to find one. As I pointed out, it would be unusual to see a smoking domestic chimney in July, but it was also a fair tribute to the clean air programmers of the London authorities. It so happened that the interview began in a street at the back of a school kitchen and the sound recordist was unable to get a clear tape for the clatter of pots and pans and other cookhouse noises. Moving to a quieter spot we suddenly emerged on several acres of waste land surrounding one derelict building with boarded doors and windows and clouds of thick black pungent Ringelmann 4 billowing from its solitary stack. This was greeted with sobs of joy and shouts of "Eureka", and I was duly interviewed with the offending chimney appearing over my shoulder. We subsequently discovered that the building was being used as an illegal doughnut factory, the smoke coming from the cooking oil! A further sidelight on this story was that my interviewer had previously recorded conversations with coal merchants in different parts of North London. In setting up the interviews he had first approached them privately asking one if he would deliver a load of logs and the other a ton of coal. Both had been happy to oblige but not surprisingly changed their stories during their interviews. At least, that is what I was told.

Regrettably the Epping Forest situation seems to be becoming increasingly common place. We now have a generation of middle aged citizens (and although at 57 I still place myself in that class, in this case I am talking about dividing three score years and ten by two), who are too young to remember the circumstances which led to the Clean Air legislation, and who simply do not understand the slippery slope onto which they are stepping when they equip their houses with woodburning stoves and end up lobbying for the revocation of smoke control orders. The problem, as I told my interviewer, stems more from ignorance than from complacency or selfishness, and what is needed is an effective and continuing campaign to teach them the errors of their ways. But I preach to the converted! Hence my plea for your indulgence!!

John Langston
Secretary General

DIVISIONAL NEWS

NORTHERN DIVISION

Thirty nine members attended the Annual General Meeting of the Northern Division which was held in the Civic Centre at Newcastle upon Tyne on Thursday, 16th July 1981. Councillor Poole was re-elected Chairman of the Division, Councillor T.W. Yellowley and Mr. L. Mair Vice-Chairmen and Mr. C.R. Cresswell, Secretary. Before the meeting commenced the sudden death of Mr. R. Love, Chief Environmental Health Officer, Stockton-on-Tees B.C. was reported and members stood for a few moments' silence in sympathy.

The Chairman welcomed the Secretary General, Air Commodore Langston, to his first meeting of the Division and assured him of the loyalty and support of the Division. Air Commodore Langston expressed his pleasure at being able to attend the gathering and meet more members of the Society.

The Secretary reported that the new authorised fuel 'Taybrite' was now on sale in the Division at a price of £110 per ton and that further supplies of the German briquetted fuel 'Ulite' had been imported into the Tyne area.

The Chairman welcomed Mr. J.D. Wildsmith, Senior Environmental Health Officer, (Pollution Control), Newcastle upon Tyne Metropolitan Borough Council, who gave a talk on the monitoring of pollen.

Mr. Wildsmith explained that although there were many varieties of pollen, each capable of adversely affecting a different group of people, most hay fever sufferers were bothered by the pollen produced by Timothy grass. This, therefore, was the type of pollen monitored at the majority of sites and used as a yardstick. As the siting of the instrument would obviously determine the number of pollen spores caught in the trap, Mr. Wildsmith said it was important that each hay fever sufferer should calibrate his reactions against the local pollen count. By this means he or she would be able to assess whether they were in for a good or a bad day and possibly plan the day's activities accordingly. The Burkard 7 day Recording Volumetric Spore Trap used in Newcastle was described and the significance of the results obtained since 1978 when monitoring commenced was explained.

In response to questions, Mr. Wildsmith said that the total cost of the exercise to date in Newcastle was under £800, results were relayed to the B.B.C., local commercial radio and three daily papers early each morning and, to the best of his knowledge, there were eight other local authorities currently involved in pollen counting.

Mr. F. Sugden thanked Mr. Wildsmith for his interesting talk about what was a new type of pollution monitoring for most people and the members showed their appreciation in the usual manner.

C.R. Cresswell,
Hon. Secretary

EAST MIDLANDS DIVISION

The Leicestershire town of Hinckley stands on the A447 and is midway between Leicester and Coventry. Divisionally speaking it is fairly centrally situated between North and South, but from East to West, is very much on our Western boundary. The town contains the offices of the Hinckley and Bosworth Borough Council. It also has an extensive modern Leisure Centre opened only four years ago and it was here that we held our Annual General Meeting by kind permission of the Mayor and Borough Council. After coffee and biscuits on arrival, our Deputy Chairman, Mr. C.W. Stacey DFC introduced the Mayor of Hinckley and Bosworth, Cllr. G.S. Morrell who was accompanied by the Mayoress, Cllr. Mrs. F. Hitchcock. Also present was Cllr. M.S. Russell the Leader of the Council.

The Mayor in extending a Civic Welcome, referred to the achievements of the Clean Air movement and said that he spoke from personal experience of the London Smog in 1952. The Mayor was suitably thanked by Mr. Stacey.

The business meeting then dealt with apologies, the Minutes of the previous AGM, the Secretary's report and the Statement of Accounts. The Secretary expressed appreciation of the way in which the Divisional meetings had continued to be supported, and of the invariable help given by local authorities and organisations in arranging meetings.

Mr. Stacey then succeeded to the Chair and elections proceeded as follows:

Deputy Chairman: Cllr. Mrs. E.J. Inglefield, High Peak Borough Council and Individual Member.
Hon. Secretary/Treasurer: Mr. E.F. Raven, Derby City Council
Hon. Auditor: Mr. J.B. Sheard, Amber Valley District Council
Scrutineers: Mr. A.A. Wild, Erewash Borough Council
Mr. F. Owen, Bassetlaw District Council
One Member of the Council of the Society (1981/84): Mr. D.F. Haynes, MP

Eighteen members to the Divisional Council: Mr. J.B. Brackenbury, Chesterfield Borough Council; Councillor W.R. Cashmore, Peterborough City Council; Councillor W. Dunn, South Derbyshire District Council; Mr. J.L. Fear, N.W. Leicestershire District Council; Councillor Mrs. A.A. Flynn, Ashfield District Council; Mr. G. Harris, Bolsover District Council; Councillor F.E. Holland, West Derbyshire District Council; Mr. J. Jones, Lincoln City Council; Councillor Mrs. B. Langham, High Peak Borough Council; Mr. J.E. Marsh, Mansfield District Council; Councillor C.A. North, Lincoln City Council; Councillor R.J. Ogilvie, Corby District Council; Mr. A. Lister Robinson, MBE, Individual Member;

Mr. J.W. Storer, South Derbyshire District Council; Councillor Mrs. E.M. Tomlinson, JP, High Peak Borough Council; Mr. R.V. Tomlinson, High Peak Borough Council; Councillor Mrs. W.M. Townroe, MBE, Mansfield Borough Council; Mr. K. Wint, Amber Valley District Council.

Mr. B.E. Clarke, Director and Engineering Manager, Burgess Products Ltd. then presented a paper entitled "Aspects of the Design and Development of Vehicle Exhaust Systems" and at the conclusion, answered a number of questions from the floor. Mr. Clarke was thanked by the Chairman for presenting the paper.

Following lunch, delegates assembled at the premises of Burgess Products Ltd. Brookfield Road, Hinckley where they were welcomed by Mr. P. Angeletta, the Company Secretary. Five parties were then conducted round the Works and were able to see the various steps in the production of exhaust systems. A particular feature was the anechoic chamber, where testing of exhaust systems in the course of development is carried out. The parties were also shown the Burgess Architectural Products Division, where a variety of telephone hood-type booths are manufactured as well as acoustic steel ceiling panels.

The Division would, I know, wish to record thanks to the Mayor and Borough Council of Hinckley and Bosworth and to Mr. Maurice Jones, their Principal Environmental Health Officer who had so capably made all the local arrangements. Thanks are also due to the Managing Director of Burgess Products, Mr. G. Reymes-Cole, to Mr. B.E. Clarke for presenting his paper at the meeting and to all the members of staff who helped with the afternoon arrangements including the refreshments which Burgess Products provided at the end of the tour of the Works.

E.F. Raven
Hon. Secretary

SOLID SMOKELESS FUELS FEDERATION – ANNUAL REPORT 1980-1981

The 1980/81 Report of the Solid Smokeless Fuels Federation showed the depressed state of trading during the year under review. In common with all kinds of fuel on the domestic market, sales of solid smokeless fuels fell because of price increase and the effect this had on the cost of heating as a part of the household budget. The use of energy conservation measures such as increased insulation and reduced temperatures in the home, and more efficient appliances, also made an impact on sales. The SSFF have concluded that customers will be increasingly conscious in the future of the need for energy efficiency and that appliances capable of heating one room fully and providing water heating/central heating as required will become ever more popular.

The sale of appliances was down during the year for the first time in 8 years. Although there were other reasons, SSFF say this was primarily due to a reduction in local authority and private building programmes, and there is no indication that the situation will change in the immediate future. The Federation has continued its campaign to encourage local authorities to build chimneys into new and existing single fuel houses. One of the reasons for this promotion is that, depending on the type of fuel used, some fuel-saving campaigns can be self-defeating as they can result in problems of condensation due to reduced heat input.

There were no problems in fuel supply during the year although the supply of phurnacite has never been sufficient to meet total demand.

In their report, SSFF echo the feelings of the National Society for Clean Air that the will and wish for clean air is on trial at the moment. The report highlights the reduction in the number of Smoke Control Orders made by local authorities, some of which were later withdrawn or not confirmed by the Department of the Environment. The Federation believes that the new EEC Directive on Smoke and Sulphur Dioxide could be helpful in reviving interest in clean air in certain areas where local authorities have been listed as approaching or exceeding the limit values laid down in the Directive. The Federation joined with the City of Sheffield in a campaign to try and reduce the amount of smoke emitted through the use of unauthorised fuels in its Smoke Control areas. Sheffield, acknowledged to be one of the cleanest industrial cities in Europe, made strenuous efforts in co-operation with the SSFF to stop all the hard work to achieve clean air being spoilt by a few people burning the wrong type of fuel.

INTERNATIONAL NEWS

NEW ZEALAND

New Zealand Clean Air Society Inc. Report for 1980/81

The Society has tried to gain publicity during the year but has not been as successful as in past years. However, other organisations have shown considerable interest and the St. Albans Residents Association have maintained a sustained clean air campaign. The City Council too has embarked on an advertising campaign encouraging ratepayers to strive for Clean Air. Our only criticism is that the M.E.D. could emphasise the importance of clean air more positively and by studying the advertising techniques of the coal industry utilise thousands of square metres of blank space for increasing the sales of electricity. The external walls of substations, large street distribution boxes, are often used for unofficial advertisements but instead these could be painted with suitable permanent advertisements at very low cost. The mural painting along the concrete wall facing the Avon Loop community for example was completed very cheaply indeed. The struggle for Clean Air is still one of educational publicity work and every opportunity should be taken to acquaint the public of the need for their co-operation.

Our membership stands at 185 and we are not gaining new members to any great extent. There have been six committee meetings during the year and one public meeting. Individual members have addressed several meetings of other organisations and Mrs. Janet Holm has taken every opportunity offered to set up our information notice board at special functions. Mr. John Image has been active with the St. Albans Residents' Association and asks to be relieved of his secretarial work for the Society this year. Mr. & Mrs. Horrocks still continue to organise the finances of the Society and Mrs. Helen Wilson has helped considerably with secretarial work as well as co-ordinating our practical activities with the Canterbury Environment Centre.

We continue to be represented on the United Canterbury Council Air Pollution Committee and Mrs. J. Holm attends meetings of the Australia and N.Z. Clean Air Society and through her efforts we maintain a close liaison. The highlight of the year was the Air Pollution Control Workshop held by the A.N.Z.C.A.S. in Christchurch during May. Our membership of the National Society for Clean Air of Great Britain enables us to receive up to date technical information on air pollution matters. Once again we thank the N.Z. Soil Association and the Canterbury Environment Centre for the opportunities to publicise our viewpoint in their Journals. We still retain our membership of E.C.O.* The treasurer will be presenting a separate report of our finances. As President I would like to thank all those who helped the Society during the year.

I personally still hold to the opinion that it is necessary for our Society to continue and believe that our frank approach to the subject of air pollution has had a major impact on the thinking of government and local government bodies over the last fifteen years. Members and supporters should ask themselves what they personally can do to sustain and nourish the Society during this period when economic difficulties beset the country. It is obvious that the Society needs more help from all concerned if we are to continue as an active force in New Zealand.

P.V. Neary
President

* Environment and Conservation Organisations of N.Z. Inc.

AIR POLLUTION GUIDELINES PROPOSED FOR THERMAL POWER STATIONS

Canada's Environment Minister, John Roberts, has announced national emission guidelines for thermal power stations. These, recently published in the Canada Gazette Part I, are intended as an aid to provinces in establishing their own regulatory requirements. The guidelines are aimed at preventing any worsening of Canada's air pollution from the electric power industry, especially acid rain. The emission limits specified in the guidelines are based upon commercially available technology capable of reducing emissions of nitrogen oxides by 50 per cent, particulate matter by 99 per cent and sulphur dioxide by 90 per cent.

Mr. Roberts said that Canada had for too long sought to control much of the air pollution from thermal power stations by dispersing the pollutants high in the atmosphere. He urged the provincial governments to change that approach for new plants "so that our children, especially in the relatively unpolluted West, will not have to face the ravages of acid rain".

Mr. Roberts explained that the guidelines would not automatically entail modifications to existing generating units in stations already in operation, but that controls on emissions from existing stations should be re-evaluated on a case-by-case basis, and changed as necessary by provincial actions. The Minister also noted that the federal-provincial acid rain control strategies programme would be recommending controls for existing stations in Eastern and Central Canada.

Studies have been made to assess the potential economic costs of implementing the recommended controls. For individual consumers the impact of increases in retail electricity prices due to these measures is unlikely to be dramatic. In six provinces no increases are forecast. In Saskatchewan the increase could be 11 per cent of 1989 predicted power prices, in Nova Scotia 3.5 per cent, in British Columbia 7.5 per cent and in Ontario 0.5 per cent. Studies indicate that the impact on national and provincial economies should be very small.

VITH IUAPPA WORLD CONGRESS ON AIR QUALITY

PARIS May 16th-20th 1983

The VIth World Air Quality Congress to be held by the International Union of Air Pollution Prevention Associations (IUAPPA) will take place at the Palais des Congres, Paris, from May 16th to 20th 1983.

The Association for the Prevention of Atmospheric Pollution (APPA), France, a founder member of IUAPPA, is responsible for the organisation of the Congress.

List of subjects accepted for discussion

1. The physics, chemistry and measurement of pollutants
2. Atmospheric pollution and health
3. Olfactive nuisances
4. Atmospheric pollution and plants
5. Atmospheric pollution and materials
6. The meteorology and physics of the atmosphere
7. Preventive techniques — the reliability and safety of installations — Economic evaluation
8. Radioactivity in the air
9. Automotive Pollution
10. Pollution caused by replacement energies

No specific papers will be presented on current levels of air pollution or on progress in monitoring networks etc. in the represented countries, but information on these topics will be presented in the form of "Posters".

A plenary conference will be devoted to the harmonisation and evolution of regulations at world and European levels.

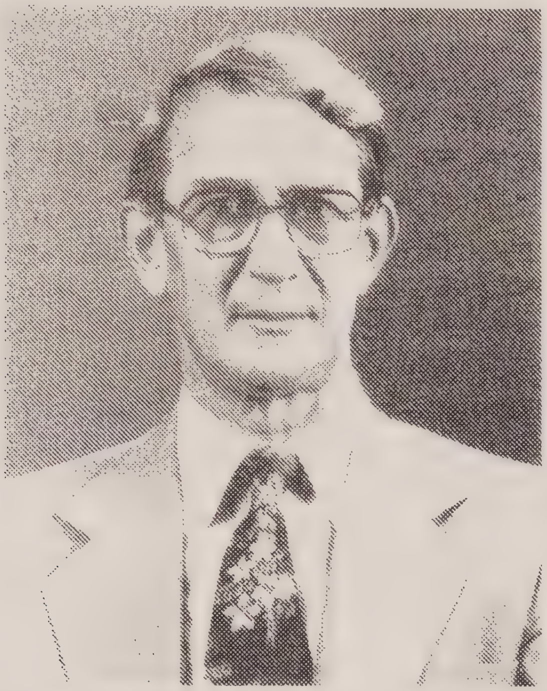
Exhibition

An exhibition of measuring instruments, detection and pollution control devices, dust removal and air-conditioning techniques will also be held at the Palais des Congres during the 6th World Air Quality Congress.

Reader Enquiry Service No. 9025

NEW CHIEF INSPECTOR OF ALKALI AND CLEAN AIR

Dr. Leslie Reed succeeded Mr. Jim Beighton as HM Chief Alkali and Clean Air Inspector on October 1st, 1981.



Dr. Reed was born in Walthamstow in 1925 and attended the Sir George Monoux Grammar School. He was awarded an Engineering Cadetship in 1943 and then joined the Fleet Air Arm as an Engineering Officer. After demobilisation he took a degree in Mechanical Engineering at University College, London, graduating with 1st class honours in 1949; he received an MSc (Eng) a year later.

He is a chartered engineer, being a Member of the Institute of Mechanical Engineers and a Fellow of the Institute of Energy.

Dr. Reed joined the Fuel Research Station at Greenwich in 1950 working initially on the combustion of pulverized coal, for which he was later awarded an external PhD from the University of London, and then on smoke measurement and abatement from the combustion of coal. On the closure of the Fuel Research Station he joined the Warren Spring Laboratory in 1959 where he was in charge of a section dealing with the abatement and dispersion of pollutants.

In 1970 Dr. Reed left Warren Spring Laboratory to join the newly created Central Unit on Environmental Pollution which became part of the Department of the Environment (DOE) in 1971. He was in charge of a professional division dealing with air pollution problems and particularly those with an international context. He chaired a number of international groups and was closely involved with the transboundary air pollution problem. In 1980 he was appointed head of the Air and Noise Division of DOE dealing with both administrative and scientific issues.

He is married, with two sons, and lives at Knebworth in Hertfordshire. His hobbies are playing badminton, gardening and DIY.

CLEAN AIR ACT 1956: SECTION 11 (4) – WOODBURNING AND MULTIFUEL DOMESTIC APPLIANCES

Reply from the Department of the Environment to the submission from the National Society for Clean Air

The Department last drew the attention of manufacturers and importers to the legal position with regard to the use of wood in smoke control areas in 1977. At the same time we explained the situation to all local authorities with a smoke control programme. However as there may be some new suppliers to the trade who are unaware that wood is not an authorised fuel, we will take up your useful suggestion and write to the Woodburning Association of Retailers and Manufacturers (WARM).

As regards the testing of woodburning and multifuel appliances for exemption under the Clean Air Act, we are considering whether a review of our test methods for these appliances is necessary given the increasing interest in the use of wood as a fuel. As you may know the test procedure for smoke reducing solid fuel domestic appliances is based on the principles laid down in the British Standards Institution's recommendations contained in their document PD6434. The intention would, of course, be to ensure that the same standards could be applied to these appliances. I will keep you informed of any developments on this.

Generally the efficiency and safety standards for heating appliances are covered by the Energy Conservation Act 1981 which became law last month. The main aim of this Act is to promote the improved efficiency of a wide range of energy consuming appliances including solid fuel heaters and boilers. The Department of Energy now have the power to make regulations to ensure that such appliances comply with certain standards either at the stage of manufacture or in some cases after installation. These statutory procedures replace the voluntary arrangements operated by many major UK manufacturers and have been extended to cover imported appliances. We will be considering with the Department of Energy the role of environmental standards in these arrangements.

SOUND LEVEL METERS

A new British Standard just published by BSI will ensure that measurements of noise levels at different times and locations can be made accurately and in a repeatable manner.

The subject is dealt with in BS 5969 *Specification for sound level meters* which covers four classes of instruments, designated according to precision at Types O, 1, 2 and 3, for the measurement of certain frequency and time weighted sound pressure levels. This standard specifies directional, frequency and time weighting, detector and indicator characteristics, as well as sensitivity to various environments. Requirements are also given for electrical and acoustical tests to verify compliance with the characteristics specified, and a method is described for absolute sensitivity calibration.

The new standard is identical with IEC Publication 651, published by the International Electrotechnical Commission, and will eventually supersede BS 3489, and BS 4197. These specifications do not differ significantly from the corresponding grades covered by BS 5969 and they will therefore be retained for at least two years, to accommodate the large number of sound level meters in current use and allow manufacturers time to meet the new international aspects of BS 5969.

Copies of BS 5969 may be obtained from the BSI Sales Department, 101 Pentonville Road, London N1 9ND. Price £12.00 (BSI Subscribing Members £6.00).

NEW BRITISH STANDARD – CHARACTERISATION OF AIR QUALITY

The British Standards Institution has published Part 1 of BS 6069, 1981: Method for Characterisation of Air Quality. Part 1, Units of Measurement, was prepared by a committee which included representatives of the National Society for Clean Air and is identical with ISO 4226 1980 "Air Quality – General Aspects – Units of Measurement".

This part of the British Standard is the first of a series relating to air quality arising from UK participation in the work of the ISO Technical Committee 146. Topics relating to general aspects of air quality characterisation will be published as further parts of the Standard and methods for the determination of particular constituents of ambient air will be published as parts of BS 1747 "Methods for the Measurement of Air Pollution".

Of particular note is the decision taken by the authors to drop the unit "parts per million" (ppm). The explanation for this is the increasing preference shown internationally for the unit "milligrams per cubic metre" (ug/m^3), and especially its use by WHO. Thus, ppm, which has been widely used in previous records and has an advantage in its independence of changes in temperature and pressure, will be dropped in future British Standards and presumably will be less and less used by technical writers hereafter.

ANNUAL REVISION OF WORKPLACE LIMITS FOR TOXIC SUBSTANCES IN AIR PUBLISHED

A revised list of recommended limits (TLVs) for airborne concentrations of over 600 potentially toxic substances has been published by the Health & Safety Executive. This list updates and replaces all those previously published.

The Threshold Limit Values are published in a Guidance Note*1 which reprints in full the list of TLVs adopted by the American Conference of Governmental Industrial Hygienists. It also lists those substances for which the Executive recommends different limits. Among them is acrylonotrile, although a recently published study*2 into whether men exposed to acrylonitrile at work in the UK suffer any excess risk of dying from cancer, neither confirms nor refutes the existence of such a risk. However, the report recommends the continuation of existing surveillance of workers exposed to acrylonitrile and the study will be continued in order to provide further evidence in the future.

The TLVs are under regular review and are revised annually. The list includes 39 new TLVs for such substances as carbon disulphide and epichlorohydrin. The list of intended changes contains over 100 entries including 45 which have been added this year eg iron pentacarbonyl and trichloroethylene.

The TLVs are expressed in two forms:

TLV-TWA	The time weighted average concentration to which it is believed most workers may be exposed over a normal eight hour working day or 40 hour week.
TLV-STEL	The short term exposure limit expressed as a time weighted average concentration over 15 minutes to which it is believed most workers may be exposed without suffering intolerable irritation, irreversible tissue change or mental confusion.

In addition, many substances are given a 'C' rating (TLV-C), indicating that this is the ceiling limit above which workers should not be exposed at all.

* **'Threshold Limit Values 1980'**, Guidance Note EH 15/80, *HM Stationery Office, price £1.50 plus postage.* ISBN 0 11 8833790.

*2 Werner, JB and Carter, M, Mortality of United Kingdom Acrylonitrile Workers. *Brit. J. of Ind. Medicine,* August 1981.

SHORT COURSES

15 - 18 November 1981 Chemical Effluents
18 - 20 November 1981 Toxic Wastes
Centre for Extension Studies, Loughborough University.
Two separate but linked courses intended for those with responsibilities for chemical effluent or toxic waste treatment and disposal. Safety aspects and treatment options discussed against background of UK & EEC legislation.
Fee: for one unit — £225.00 (incl. residence/course material)
for both units — £375.00 (incl. residence/course material).

24 November 1981 The Economics of Pollution Control — One Day Teach-In
National Society for Clean Air, South West Division.
Bristol Polytechnic (Room 4E13), Coldharbour Lane, Bristol.
Six wideranging papers to be presented; central theme is that despite the present recession pollution control can be a valuable economy measure and not necessarily one for which there is no tangible return. Speakers: M. Tunnicliffe, Deputy Chief Alkali Inspector; Trades Union speaker to be announced ; A. Sotheran, Chief Combustion Engineer, Rolls Royce Ltd.; D. Willis, Head of Industrial Development, Coal Research Establishment; Dr. T. Shaw, Project Manager, Sir Robert McAlpine & Sons Ltd.; M.S. Whitfield, Computer Engineering Manager, Rolls Royce Ltd.
Fee: £15 or £8 for members of the NSCA's South West Division.
Details: National Society for Clean Air, 136 North Street, Brighton BN1 1RG.

NEW REGULATIONS PROPOSED TO EXTEND HEARING PROTECTION TO EVERYONE AT WORK

Draft proposals for a uniform statutory system of noise control which could extend hearing protection to everyone at work have been published in a consultative document* by the Health and Safety Commission.

In addition to the outline of proposed regulations, the consultative document also contains a draft Approved Code of Practice giving guidance on compliance with the regulations and a draft Guidance Note explaining the technology and terminology of noise control. Published with it is a complementary document** containing some of the material taken into account by the HSC in the formulation of its proposals.

The proposals are based on the principles of existing specific noise legislation applying in certain industries and a voluntary Code of Practice*** issued in 1972. They are designed to promote a universal levelling up of standards to those already achieved by many firms.

Since the HSC decided to publish this consultative document, the European Commission has started discussions on a first draft of a proposal for a Council Directive on the protection of workers from noise. However, it is too early to forecast what changes the European Commission might make to its draft or when the formal submission of a proposal will be made to the Council of the European Communities.

Comments on the HSC's consultative document will be taken into account when determining the UK position on the draft Directive. The need to implement the requirements of any Directive eventually adopted by the Council will clearly be an important factor in determining future action to be taken to control noise in this country.

The proposed regulations outlined in the HSC document lay down the principles of hearing conservation and indicate the conditions under which various actions would be required. A general duty would be placed on employers to reduce *any* exposure to noise likely to be injurious to hearing to the lowest level reasonably practicable and to ensure that no-one is exposed at work to noise above an average of 90 decibels over an eight-hour day — 90dB(A) Leq(8hr).

* Consultative document: Protection of Hearing at Work: Content of proposed Regulations and draft Approved Code of Practice and Guidance Note. HM Stationery Office, price £3.00 or from booksellers. ISBN 0 11 8834312

** Some aspects of noise and hearing loss: notes on the problem of noise at work and report of the Health and Safety Executive's Working Group on Machinery Noise. HM Stationery Office, price £3.50 or from booksellers. ISBN 0 11 8834320

*** Code of Practice for reducing the exposure of employed persons to Noise. HM Stationery Office, price £1.05 or from booksellers. ISBN 0 11 8803409

Where exposure is likely to be above 90dB(A) Leq(8hr) employers would have to reduce noise levels to the lowest level reasonably practicable. This means that engineering control of noise levels should be provided where the cost is not excessive in relation to the benefits obtained. If such control is not reasonably practicable or does not reduce exposure to that limit, then other means such as personal protection may be used. Other actions required above this level by employers are: arranging noise surveys; providing information, instruction and training; checking control measures etc. are used; producing a programme of action; appointing a qualified noise adviser; and keeping exposure records. In addition, where exposure is likely to be above 105dB(A) Leq(8hr), employers would have to arrange for audiometry (the measurement of employees' hearing loss) to be carried out and for the monitoring of individual employees' exposure to noise.

A number of other duties are proposed: on employees, at any level of noise, to co-operate with employers and make full and proper use of the control measures etc.; and on designers, manufacturers, suppliers and importers of machinery to ensure, so far as is reasonably practicable, that noise produced is not likely to injure hearing; to carry out testing, examination and research; and, above 90dB(A), ensure that necessary information is available.

The HSC says it is aware of the strongly-held and differing views about 90dB(A) Leq(8hr) as the main action level but points out that, when coupled with the general duty to reduce all exposure likely to be injurious to hearing to the lowest level reasonably practicable, this standard seems a sensible first step. It is clear, it says, that in view of the evidence of risk below 90dB(A) Leq(8hr), those responsible ought not to be relieved of all duties to minimise exposure. More effort should, however, be required above this level than below it.

In accepting that any attempt to impose an absolute requirement for all noise to be reduced to one limit would impose an intolerable burden on industry and probably result in closure of some plants, the HSC says it has sought a solution in which priority in use of resources is given to areas where risk is greatest and where expenditure of resources will bring the greatest benefit in reduction of the number of workers suffering hearing loss caused by noise. It proposes that the duties to reduce noise levels should be limited by 'reasonable practicability' thus allowing the cost of noise reduction to be related to the risk of hearing loss.

The HSC points out that, since the problem of risk of hearing loss due to noise at work is widespread and the costs of reducing noise levels vary enormously, the formulation of proposals that will ensure a sound basis for protection of workers has proved difficult. It hopes that the present proposals will provide the basis for discussion before the preparation of proposals for regulations and an approved code of practice.

Comments on the document should be sent to Mr. C.O. Leite, Room 12.17, Health and Safety Executive, 25 Chapel Street, London NW1 5DT by 30 April 1982.

The scale of the problem

In its introduction, the HSC says it is clear that noise represents a serious problem because of the number of workers exposed to potentially damaging noise levels. It is estimated that in manufacturing industry alone, some 600,000 are exposed above 90 dB(A) and over 2½ million at levels above 80dB(A). The complementary document describes the way in which exposure to noise at work increases the degree of hearing loss in a typical industrial population where some people will also suffer some hearing loss from other causes such as illness, ototoxic-drugs (drugs which can affect hearing) and past exposure to gunfire. Taking these difficulties into account, a graph in the consultative document shows the risk of hearing loss in a typical industrial population at 65 years of age. For example, for workers of this age the risk of 50dB hearing loss is:—

Level of exposure	Number of 65-year-olds in every 100 likely to suffer 50dB hearing loss	
dB(A) Leq(8hr)	*Lifetime exposure to noise at work*	*10 years' exposure to noise at work*
100	32	17
90	11	5
80	3	1

(50dB hearing loss, due in one ear at least to noise at work, corresponds to 20% disablement on a scale of payment of disablement benefit in certain occupations and is the level at which entitlement begins).

The table shows that the reduction of noise from 100 to 90dB(A) Leq(8hr) achieves a 'saving' of 21 persons in every 100 suffering a 50dB hearing loss and a reduction from 90 to 80dB(A) Leq(8hr) achieves a further saving of eight persons in every 100. Similar calculations can be made for different levels, exposure duration and degrees of hearing loss.

The document says that it is clear from these figures that the degree of reduction of risk achieved by reducing the levels from 100 to 90dB(A) is much greater than that of reducing it from 90 to 80dB(A) and the maximum benefit in terms of protection of hearing will be gained by directing the major effort at noise control towards those exposed above 90dB(A) Leq(8hr). Nevertheless it is clear that there is still a risk, albeit less, at levels below 90dB(A) Leq(8hr) and that this merits appropriate action where it is reasonably practicable.

Present legislation

Present legislation containing explicit noise requirements applies only to a limited number of activities (woodworking and offshore industries, and the cabs of agricultural tractors). The rest of industry is covered by the general duties concerned with health and safety imposed by the Health and Safety at Work etc Act 1974, and when considering how these apply to noise, present practice is to refer to the voluntary code of practice published by the Department of Employment in 1972 (and subsequently re-published by the Health and Safety Executive). The HSC says that the present practice suffers from the disadvantage that there is the possibility of differing views being taken on how far various measures are required by law.

Europe

The European Commission is developing a proposal for a Directive on the protection of workers from noise for submission to the Council of the European Communities and is discussing the first draft of a proposal with Working Groups, including trade union, employer and government experts, before deciding on a formal proposal to the Council. In certain areas (including the extent of provisions for medical examinations and obligations to reduce noise) the European Commission's first draft proposal could involve more extensive provisions than are proposed in the HSC's consultative document. However, as already indicated, it is too early to forecast what changes the European Commission might make or when the formal submission to the Council will be made, much less what form any Directive eventually adopted by the Council might take. The proposals in the consultative document do comply with the existing Council framework Directive on protection of workers from exposure to chemical, physical and biological agents.

Costs and benefits

On the costs of implementing the requirements, the document points out that recommendations similar to those now put forward have been in existence since 1972 and that the general requirements of the HSW Act already place a duty on employers to prevent hearing damage so far as reasonably practicable. Some employers have made considerable efforts in this field, others have done very little. It is consequently not possible to assess the costs which would be imposed by the additional requirements of these regulations. The costs falling on employers, however, could include quietening of noisy machinery; ear protection; noise surveys, and individual monitoring of exposure.

Assessment of the benefits likely to flow from the proposed requirements is similarly complicated. The main likely benefits anticipated are a reduction in the number of workers suffering the social handicap which deafness undoubtedly represents and a reduction in the number of claims for disablement benefits and civil claims for damages. There is some evidence, the document says, that noise reduction might have beneficial effects on productivity, product quality and absenteeism but this is unquantifiable.

Complementary document

In order to help people wanting to comment on the HSC's proposals, a complementary document contains some of the material taken into account during their preparation. This document outlines the problem of noise and methods of dealing with it.

Also published in this document is the report of the Health and Safety Executive's Working Group on Machinery Noise which considered how far it is possible for manufacturers, designers, importers and suppliers of machines to take positive action about noise. It makes a number of recommendations on the action that they could take including: classification of machines according to the noise they generate; provision of information on how much noise machines create; labelling of machines likely to be noisy enough to be particularly hazardous to hearing; provision of instructions on how to avoid risk to hearing when the machines are used; ways of ensuring that machines operate as quietly as is reasonably practicable; research and development by manufacturers and proper training of design, development and testing staff.

ANNEX Summary of proposals and exposure levels giving rise to the proposed duties

Duties	Where exposure is likely to be:		
	Below 90 dB(A) Leq (8hr)	**above** 90 dB(A) Leq (8hr)	**above** 105 dB(A) Leq (8hr)
Employers are to:			
reduce exposure likely to be injurious to hearing to lowest level reasonably practicable.	▨	▨	▨
reduce exposure by reduction of noise levels to lowest level reasonably practicable and then, if necessary, by any other means.		▨	▨
arrange for surveys.		▨	▨
provide information, instruction and training.		▨	▨
provide ear protectors.		▨	▨
check that control measures etc. are used.		▨	▨
produce a programme of action.		▨	▨
appoint a qualified person to advise.		▨	▨
keep records of exposure.		▨	▨
arrange for audiometry.			▨
arrange for individual monitoring of exposure.			▨
Employees are to:			
make full and proper use of control measures etc.	▨	▨	▨
co-operate with employer.	▨	▨	▨
Manufacturers etc. of machines are to:			
ensure, so far as is reasonably practicable, that noise produced is not likely to be injurious to hearing.	▨	▨	▨
carry out testing, examination and research.	▨	▨	▨
ensure that necessary information is available.		▨	▨

INDUSTRIAL NEWS

Advice on how to Cope with Degraded Diesel

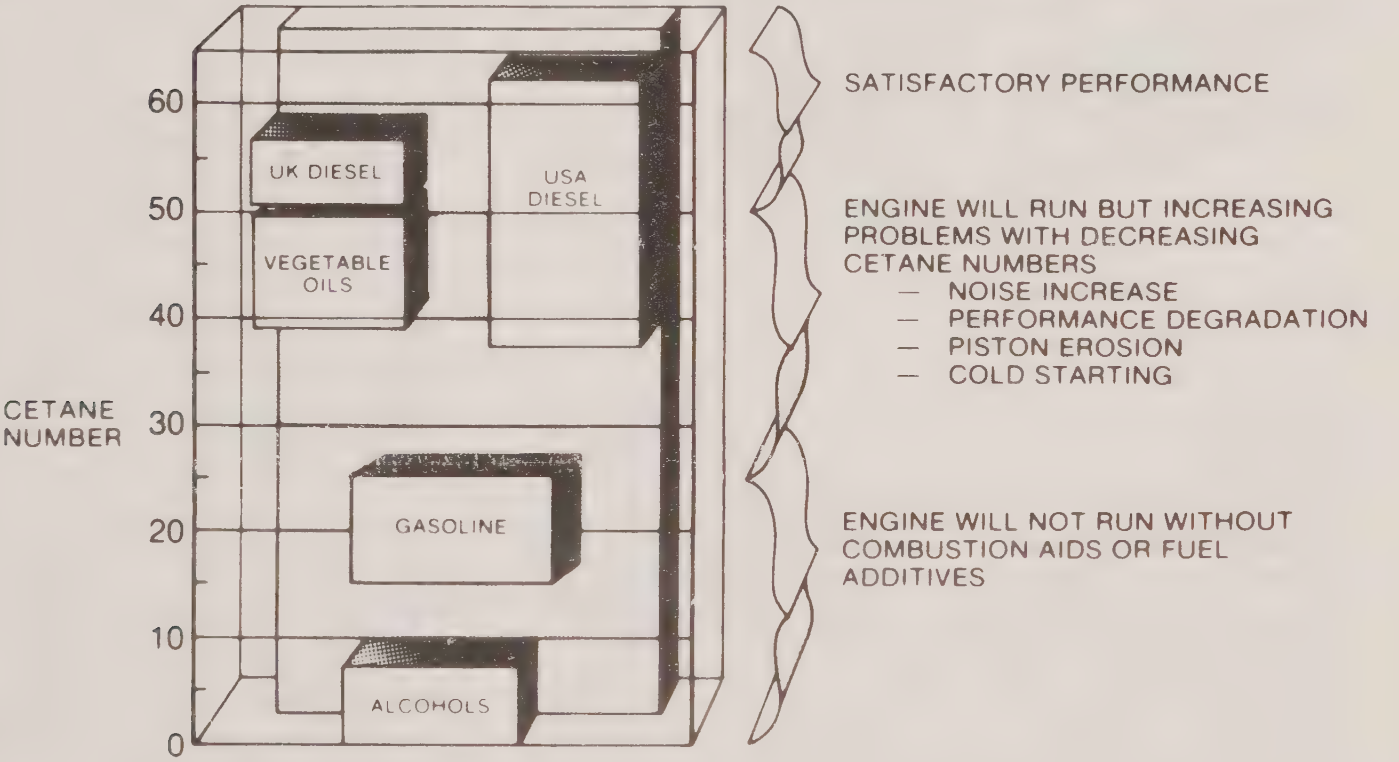
In various parts of the world, the quality of diesel fuel is being degraded, to the extent that both the performance and life of diesel engines would be seriously affected.

As the price of fuel becomes more expensive and fears grow on future supplies, so the degradation will both continue and probably worsen.

To help operators combat not only this gloomy situation but other problems associated with the future fuels situation, Perkins Engines has begun the publication of a series of information bulletins, the first of which points out the symptoms of the effects of degraded fuel and the steps that can be taken to guard against the consequences.

These bulletins are being issued to the worldwide Perkins distributor and dealer network who, in turn, will have copies available for operators of Perkins-powered equipment.

TYPICAL CETANE NUMBER VARIATIONS



The first bulletin looks at the common effects of fuel degradation, pointing out that, in the first place, operators would notice a reduction in engine performance and an increase in the amount of smoke emitted. If the usual investigation into the condition of the engine and the setting of the fuel injection equipment fail to rectify the problem, then the trouble may well be degraded fuel.

If this is suspected, then Perkins advises its distributors to determine the characteristics of the fuel involved, either by referring to the local fuel supplier or by commissioning a sample analysis at an independent laboratory.

The features of the fuel which should be checked on, the effect any alteration of them will have, and the remedial action to be taken are as follows:–

FUEL FEATURE	*EFFECT*	*ACTION TO TAKE*
Viscosity – a measure of the flow characteristic of the fuel.	Any change will affect fuel delivery, the operation of advance units and hydraulic governor mechanisms.	Increase the fuel delivery and an early advance setting to compensate for greater internal fuel leakage. The change must be carried out by a Perkins or CAV dealer.
Cetane number – a measure of the burning properties of the fuel	If it is too low, the onset of combustion is delayed with a consequent worsening of engine power and smoke.	The fuel cetane number should preferably be over 50 and at worst, 45. If it is as low as 40, a harsh combustion condition in the engine will result and the injection timing must be retarded.
Sulphur content	If this is too high, certain critical components will start to corrode.	A sulphur content up to 1% is acceptable, if a lubricating oil with a high total base number (at least 10) is used. If such lube oil is not used, and the sulphur content is higher than 0.6% (by weight) then oil changes must be more frequent.
Specific gravity – determines the energy value of the fuel fed into the engine	A reduction of specific gravity brings down the output of the engine.	If the specific gravity falls below 0.820, then fuel pump delivery should be adjusted upwards to restore the mass of fuel injected per stroke to its original value: another job that must be done by a Perkins or CAV dealer.

Reader Enquiry Service No. 9026

NEW ENERGY CONSERVATION TEACHING PACK

A new education pack, "Energy conservation – a basic education pack" has been published. The pack, jointly produced by the Department of Energy and the Adult Literacy and Basic Skills Unit (ALBSU), has been prepared for adults who are studying the basics of literacy and numeracy, and is designed to show how they can use energy more efficiently. There are fourteen activity sheets in the pack which encourage energy conservation study in the home, in transport and at work. The pack costs £1.75 plus p&p and is available from: Adult Literacy and Basic Skills Unit, Kingsbourne House, 229/231 High Holborn, London WC1V 7DA.

Toxic Gas Analysers from Analysis Automation

Analysis Automation Limited of Eynsham, Oxfordshire, manufacturer and supplier of gas analysers and systems for on-line process control, and environmental monitoring, can now offer a complete range of Ecolyser toxic gas analysers that can be used as portable or fixed site monitors for the detection of CO, H_2S, NO and NO_2.

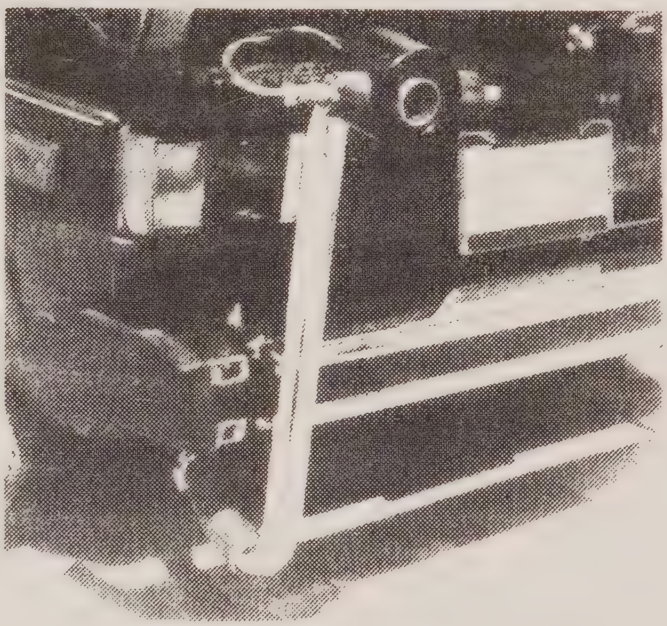
Each model in the range is extremely sensitive and is capable of monitoring at parts per million (ppm) levels. They also cover the important tlv (threshold limit values) of the gases being monitored.

Ecolysers operate on a proven, patented, series of electrochemical sensors, which are accurate, specific and stable; minimum scale ranges are 0-50 ppm for CO, 0-25 ppm for H_2S, 0-2 ppm for NO_2 and 0-10 ppm for NO. Most of the instruments are available as dual range analysers and can have built in alarm facilities, making them ideal for workplace monitoring. In addition the fixed site monitors are available with sequential sampling systems to allow area monitoring of an entire plant or process area.

Reader Enquiry Service No. 9027

Portable Smokemeter for Diesel Engines

The new Model 200 portable smokemeter from Telonic/Berkeley UK provides accurate measurement of smoke emission at the exhaust pipe of diesel-powered vehicles and equipment. It is easily fitted to the exhaust pipe and is supplied with a floor stand and short extension pipe for stationery testing or with a vertical riser pipe and vehicle mounting bracket for mobile use.



The Model 200 is of robust construction to withstand field use and has a pulsed LED light source to give readings unaffected by ambient light changes. Its performance conforms to all relevant EPA, SAE and ISO specifications. The small electronic control and readout unit is easily located inside a vehicle for mobile testing and its liquid crystal digital readout displays smoke opacity to 0.1% accuracy or K factor (smoke density) to 0.01 m^{-1} accuracy. An output is provided for recording either quantity.

The unit can be powered by a variety of sources including D size cells, 12V vehicle battery (via cigar lighter adaptor) and 115 or 220 Vac. A strong padded carrying case is provided for the control unit.

Reader Enquiry Service No. 9028

SONOMUFF — A Quiet Revolution

Sonomuff, a new development in very high attenuation hearing protection is the result of an extensive two year development programme involving hundreds of carefully controlled scientific tests of earshell and headband designs, materials and techniques.

Sonomuff gives significantly better hearing protection at both low and high frequencies than most similar hearing protectors on the market, yet it weighs just 250 grams. Tests have shown that Sonomuff achieves 30dB attenuation at 500 Hz and a remarkable 46dB at 4,000 Hz when tested in accordance with ASA Z 24.22-1957.

An acoustic tunnel was specially constructed for the development of Sonomuff. Providing the engineers with critical data it has led to the development of a distinctive earshell shape that adds significantly to the hearing protector's high performance.

Earpad design too was shaped by results from tests in the acoustic tunnel. The engineers found a combination of materials that gives excellent ear/protector sealing characteristics without resorting to fluid filled earpads normally found on high performance earmuffs. Tests showed that the new pads react very quickly to movement and in many cases give better sealing than fluid pads.

The unique two piece headband design gives an even and effective pressure over the range of adjustment — a key factor in achieving good performance from a hearing protector. The headband also swivels to allow Sonomuff to be worn with an industrial safety helmet.

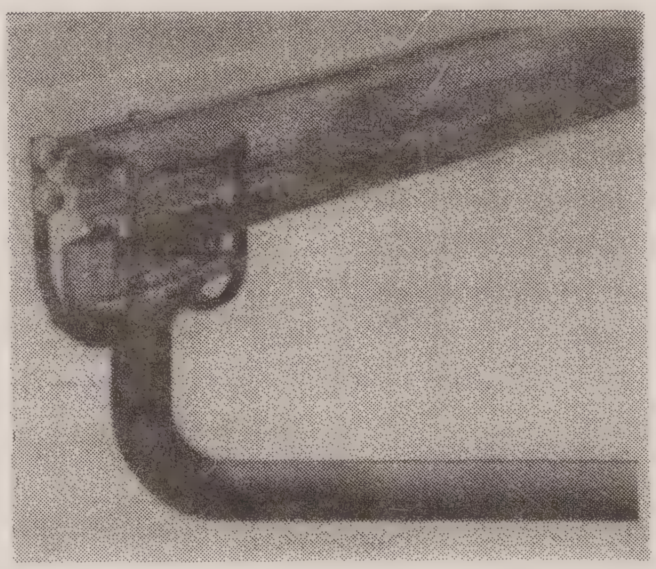
Sonomuff has been designed to meet stringent overseas safety equipment standards and to meet the anticipated new British Standard for hearing protectors.

Reader Enquiry Service No. 9029

An End to Exhaust Fume Pollution in Garage Workshops

Garage mechanics could be working in much healthier environments in future, free from pollution by vehicle exhaust gases, because of a new fume extraction system introduced by Secomak Air Products Ltd.

The only real solution to the exhaust pollution problem is adequate ventilation. Whilst high capacity extraction fans can keep down air-borne contaminants to safe levels, they are an inefficient method and enormously expensive in terms of space heating. But, the new Secomak System NORFI promises to solve this problem, safely and efficiently, by extracting exhaust fume at source without adding to Winter fuel bills.



The NORFI system is based on overhead ducting in which a negative air pressure is constantly maintained by an extraction fan. Two types of ducting are available, in either galvanized sheet steel or extruded aluminium modules, in a range of standard lengths and cross-sectional areas. The underside of both duct types is made up of two continuous neoprene rubber strips, which press together and maintain a seal. Reinforced rubber suction hoses are suspended at intervals along the ductwork. These are mounted on travelling gear which slides between the rubber strips and discharges the exhaust gases into the duct. The other end of the hose is simply pushed or clamped onto the vehicle exhaust pipe.

The hose-to-duct sealing system and travelling gear allows the hoses to be moved along the duct from one repair bay to another. This provides for working flexibility and eliminates the need for an individual extraction hose at every service bay.

Secomak will normally undertake all NORFI system engineering design and installation work but modular kits will also be available, for service stations of up to ten bays, which can be installed easily by the customer.

Reader Enquiry Service No. 9030

Fluidised Combustion Contractors Limited

Agreement has been reached between Babcock Power Limited and BP International Limited for Babcock to acquire the whole of BP's 50% interest in the Babcock - BP jointly owned company, Fluidised Combustion Contractors Limited (FCCL). The other 50% is being transferred from Babcock Contractors Limited to Babcock Power.

It is Babcock's intention to continue to develop its competence in the field of fluidised bed combustion and to exploit the technology as an integral part of Babcock Power's commercial activities. The restructured FCCL will continue to trade, located in Babcock's offices at Crawley.

Reader Enquiry Service No. 9031

Teller Environmental Pollution Control Test Plant Available

Crawley-based process engineers and contractors, Babcock Woodall-Duckham Ltd. — European licensee for the Teller System of removing gaseous acids and particulates from high temperature exhaust gases — now has a mobile Teller plant available for leasing to clients.

The facility will enable plant operators facing environmental control difficulties to evaluate the efficiency of the Teller System in bringing their final exhaust gases within permitted environmental pollution tolerances.

The patented dry gas clean-up system developed by Teller Environmental Systems Inc. of the USA has been widely used for several years. It can be readily applied to secondary aluminium refiners, industrial and municipal incinerators, glass furnaces, petroleum coke calciners, ceramic kilns, iron foundry cupolas and other corrosive gas systems containing particulate matter.

The test plant reproduces exactly the conditions found in a full size plant and provides a reliable guide to the effectiveness of the Teller system when applied to commercial-scale operations. When erected on a client's site, it readily links up with the existing process. The installation period is short and no special site preparation is called for.

The test plant is easy to install, simple to operate and can be quickly dismantled for transportation to another site by road or rail. Within hours of start-up measurable results are available for analysis.

Clients are also able to establish the optimum amount of re-agents needed for their operation as well as the ideal process conditions for any particular requirement. Analysis will identify the extent of pollution present and permit evaluation of the potential for recovering commercially-saleable waste products such as filler material for asphalt coated roadstone.

The mobile Teller Test Plant will be of use to Local Authorities in evaluating the acceptability of existing operations. It will assist them in determining suitable methods for alleviating nuisance caused by atmospheric emissions in their areas.

Reader Enquiry Service No. 9032

High Efficiency Catalytic Incineration Process — ECONOCAT.

Courtaulds Engineering Limited are now marketing a new high efficiency catalytic incineration process which uses a modified manganese catalyst in place of the more expensive precious metal catalyst. Lambeg Industrial Research Association of Lisburn, Northern Ireland, who have developed this new catalyst over the past ten years, have confirmed that it exhibits significant resistance to poisoning, which feature is of prime importance in certain industrial applications. Destruction of odours by direct thermal incineration involves oxidation at temperatures exceeding 750° centigrade which is expensive in capital and fuel costs; the advent of a precious metal catalyst system permitting oxidation to be achieved at substantially lower temperatures enabled significant savings to be made in plant operating costs. Now, a high efficiency, modified manganese catalyst should lead to considerable further savings. The ECONOCAT process is low cost and is able to operate at lower temperatures than alternative catalyst systems, saving fuel and reducing operating costs.

The 'ECONOCAT' catalyst system is ideally suited for effectively handling the odourous discharge from processes, such as maggot breeding, offal rendering and other similar trades, together with emissions from industrial processes such as paint spraying and curing, wire enamelling, strip coating and others. Odourous discharges from service industry operations such as food preparation and cooking can also be handled successfully. Full details of the process can be obtained from Courtaulds Engineering Ltd, P.O. Box 11, Foleshill Road, Coventry — Tele: 0203 88771.

Reader Enquiry Service No. 9035

NATIONAL SOCIETY FOR CLEAN AIR

nsca CHRISTMAS CARDS

good quality cards (21 cm x 15 cm) depicting
a South London Street at Ham, London in December, c 1890
in packs of ten, complete with white envelopes
£1.55 per pack of ten cards

nsca TIE

IDEAL CHRISTMAS PRESENT

Dark navy blue tie complete with nsca motif in white
£3.65 each

Cash with order please — Prices include postage and packing

Both above items are available from

National Society for Clean Air
136 North Street, Brighton BN1 1RG

a warm welcoming 'COALITE' fire

On shivery nights it's so nice to come home to a Coalite fire. Coalite lights easily, burns beautifully with no smoke, soot or sparks. No wonder more and more people are turning to the open fire–and to Coalite.

'COALITE'

Britain's best selling smokeless coal

P.O. Box 21, Chesterfield, Derbyshire.

Reader Enquiry Service No. 9033

Caring for the environment

The Central Electricity Generating Board has received more than 40 Commendations and Awards for environmental schemes at power stations, substations and associated nature trails and field study centres in England and Wales.
They include the Arnold Marsh Clean Air Award, two Prince of Wales Awards, four from the Business and Industry Panel for the Environment, six RICS/Times Conservation Awards and nine Wales in Bloom Awards.

Central Electricity Generating Board

Reader Enquiry Service No. 9034

CLEAN AIR

VOL.11 NO.4

nsca

WORKSHOP 1982

INDUSTRIAL AIR POLLUTION LOCAL PROBLEMS AND NATIONAL POLICIES

24 & 25 MARCH 1982
NOTTINGHAM UNIVERSITY

Programme

Wednesday 24 March

Problem Areas – The Case for Local Control – *Trevor Townsend*
Problem Areas – The Case for National Control – *M.P. Cabot*
An Industrial Viewpoint – *John Fletcher*
Access to Information – Can Part IV of the Control of Pollution Act be made to work? – *Dr. Graham Bennett*
Planning Control – Case studies of successful/unsuccessful control approaches – response of the local community – *Christopher Wood*

Thursday 25 March

Local Problems and National Policies
West Germany – *Dr. Ing. K. Grefen*
Holland – *Hubert Meiners*
Inputs to Legislation EEC/UK – Do local authorities and industry have sufficient say?
Paul Evans, DOE; Richard Marsh, CBI; Arnold Price, EEC; Frank Reynolds, Leeds CC.

The NSCA's 1982 Workshop will present a unique opportunity to discuss local problems of industrial air pollution in the context of national and international control strategies. The carefully balanced list of speakers and topics will ensure that the adequacy of present controls is examined from all angles, and the programme has already aroused considerable interest among those working in government and industry. Above all, it is an event which will tackle the concerns of the public at large on a wide range of subjects related to the siting and activity of industry in the community.

Registration forms and details from NSCA, 136 North Street, Brighton BN1 1RG. Tel: Brighton (0273) 26313.

Reader Enquiry Service No. **8036**

CLEAN AIR

THE JOURNAL OF THE NATIONAL SOCIETY FOR CLEAN AIR

Vol. 11, No. 4 ISSN 0300-5143 1981

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HEAVIER LORRIES

Following publication of the Armitage Report "Lorries, People and the Environment" the Government has put forward a White Paper proposing an increase in the maximum permitted weight of heavy lorries to 40 tonnes, subject to new limits on dimensions and to rules on axle weights and spacing to protect roads and bridges. These proposals have raised a storm of protest from local and national amenity groups, and have had a rough ride so far in the House of Commons.

Introducing the proposals in the House, the Secretary of State for Transport, Mr. David Howell, said that the measures were directed to keeping lorries away from the places where people lived, through the provision of more bypasses; to making the vehicles quieter and cleaner, and, in particular, to keeping their numbers down. The Government has rejected Armitage's maximum vehicle weight of 44 tonnes, but is convinced that maximum lorry weights can safely be raised to 34 tonnes for four axled vehicles, and 40 tonnes on five axled.

Mr. Howell has stated that the overall effect of the proposals would be a reduction of up to 10,000 in the number of lorries, and that the heavier vehicles should meet the same standards for noise, pollution and road safety as existing maximum weight vehicles. While noise is acknowledged to be a problem, a "quiet" heavy lorry is promised for the 1990s. But this was originally promised for the 1980s, and is not yet in production, while such problems as rolling noise still remain to be solved.

With regard to emissions, the Society has already called for stricter smoke emission acceptance testing of new diesel engined vehicles, to reduce at the outset the potential for smoke emission. Does the Government proposal that heavier lorries should meet the same emission standard as existing maximum weight vehicles mean that they are to be limited to the same "smoke quantity" rather than the same "smoke concentration"? If so, the law will need amendment. Total levels of particulates from diesel-engined vehicles have been increasing steadily over the past decade, and as these emissions have about 3 times the soiling capacity of particulates from coal combustion, the effect of lorries on air quality in heavily trafficked urban areas could be significant. The contribution of lorries, and road traffic generally, to air pollution levels in towns and cities should be reappraised before any Government committment is made to continuation of present standards, and more checks should be carried out in future on emissions from vehicles in use.

MODERN TIMES IN BRIGHTON

1981 CONFERENCE 5 – 8 October 1981

Charlie Chaplin's visionary film may have been echoed in some of the discussions at Conference, but was totally unreflected by the superb setting, the Foyer Hall of the new Brighton Centre. The excellent facilities made it pleasurable to work during the morning and afternoon sessions, and to relax during the evening social events.

Happily, attendance at the Conference kept pace with last year, the number of registered delegates being 251. It was very encouraging to be able to hold our own at a time when many other conferences are suffering from a drop in attendance and this fortunate position was a tribute to the hard work carried out by the Conference Committee and organisers in arranging for an attractive programme and venue. The papers were particularly well received by delegates, some of whom commented that the speakers had put their points over extremely well and succeeded in pitching the presentations to suit the audience.

The social programme was well supported and, some felt, enlivened by the presence in the Brighton Centre of the rock groups, Saxon and Ultravox. However, not all agreed that "Rock 'n Roll ain't noise pollution"!

Although the independent exhibition organisers were not able to arrange a full pollution control exhibition, ten stands were mounted and manned by different industrial concerns. These were situated in the Foyer Hall so that people could visit the exhibits during breaks in sessions.

There was also an exhibition of award-winning and other designs submitted for the Society's Poster Competition. The competition, organised during 1981 to stimulate interest in clean air and noise control among school pupils, attracted 1,500 entries. Top prizewinners received their awards from the Society's President during the Conference. The display of posters attracted considerable interest, and requests have been made for the exhibit to go on tour around the country. (Note: A full list of poster competition award-winners is published elsewhere in this issue.)

Exhibition of designs submitted for the Poster Competition

Welcoming delegates to the Conference, the Society's Chairman, *Mr. Harry Giblin*, predicted that the lively and varied programme would stimulate interest and controversial discussion. He was not disappointed. Low frequency sound was a particularly successful topic, with a winner of a paper presented by Hylton Dawson of Rolls Royce which generated wide press interest, and subsequently letters from various members of the public who felt that, at last, someone understood their problems, took them seriously, and perhaps could suggest solutions.

OPENING SESSION

The Earl of Avon's Address given at the Opening Session was published in the last issue of Clean Air, and in this issue we publish the text of the Presidential Address given by Naomi McIntosh. Lord Avon's speech highlighted the important role of the National Society for Clean Air in relation to the Department of the Environment, and this point was picked up in the response to the guest speaker by the Chairman. *Mr. Giblin* stressed the need for the Society to maintain the initiative on a wide range of clean air and noise matters, and the importance of attracting interest and support among young professionals in the field and younger members of the general public. *Naomi McIntosh* also felt that it was essential that the Society should spread its net as widely as possible, and promote education at all levels so that the present and future adult population may be more aware of the environmental implications of government decisions on energy policy, and the effects of their own choices as consumers.

Lord Avon

ENVIRONMENTAL IMPACT ASSESSMENT

Environmental Impact Assessment (EIA) is a hot subject at present, with debate centred around the draft EEC directive. *Dr. Brian Clark* of Edinburgh University's PADC Environmental Impact Assessment Research Unit presented a paper on the current status of EIA in the United Kingdom in the light of the proposed directive, and gave an excellent review of methods and procedures and the way in which they would be implemented. *Donald Sabey* of Leicestershire County Council looked at EIA as it operates at present in the UK, highlighting the Vale of Belvoir Inquiry. The discussion opener, *David Mace* of BP International, explained that BP had a longstanding requirement for assessing the environmental impact of all developments and projects undertaken by the company. Mr. Mace reviewed his own company's assessments and the concerns expressed by industry in general about the proposed EEC procedure. Amongst those were doubts about whether confidentiality would be properly maintained, the possibility of additional delays, and concern that any requirement for environmental monitoring should be the responsibility of the statutory authorities and not local authorities as was implied in the draft directive.

Discussion generally focussed on the potential conflict or overlap of existing UK legislation with any new, formalised procedure for EIA. *Michael Gammon* of the CEGB felt that it was important that small and medium-sized industrial development should be covered by any Directive and that those organisations which were already conscientious about environmental protection should not suffer the risk of undue delay in projects undertaken under a new procedure. *Frank Reynolds,* Director of Environmental Health, Leeds, expressed concern about the possible abnormal operation of major hazard installations and stressed the importance of ensuring that EIA should identify the potential for and the effects of abnormal operations and how the public might be protected from damage and hazards which could occur. Above all, discussion on EIA emphasised the need to regard such assessments as an aid to decision-making, and not as an end in themselves.

LOW FREQUENCY NOISE

As *Geoff Charnley* of Southampton said, opening the discussion, *Hylton Dawson* and his colleagues at Rolls Royce had undertaken a mammoth task of collating vast quantities of field data and had produced what could well become accepted as the authoritative work on low frequency design, at least until further research overtook it. *Stephen Benton* of Chelsea College also provoked a good deal of discussion with his paper on the subjective effects of low frequency noise; his conclusion that it would be necessary to develop a cohesive overall model of hearing in order to establish viable noise criteria was challenged on the grounds that this might take years, while in the meantime local authorities were being pressured by public complaints to do something about low frequency noise now.

Several interesting case histories were aired during the discussion and *Mr. G.R. Millington* of Wakefield MBC felt that it would be useful for the National Society for Clean Air to make a collection of such case histories in order to establish a "data bank" of experience to which local authorities could refer.

Conference session in progress

INDUSTRIAL POLLUTION – CASE HISTORIES AND PRACTICAL SOLUTIONS

Dr. Bernard Leadbeater of Bradford University presented some of his own experiences in the control of odours from a very mixed bag of processes. His remarks spurred *Dr. Alistair Keddie* of Warren Spring Laboratory to comment on the Laboratory's work on odours, which had led to the recently published report. He ran through the most common sources of complaint, typical odour production rates and residual odour emission rates downstream of abatement systems, and the efficiencies of various control methods. Finally, he summarised the important steps in any attempt to control odour, agreeing with Dr. Leadbeater that dispersion was not the method to rely on for odour "control" or reduction of complaints. However, there always would be a residual odour, potentially capable of giving rise to complaints, which adequate dispersion might help to improve.

William Cowie's paper on re-use of contaminated land stimulated discussion of methane recovery and, from *County Councillor R.J. McElvenney* of South Yorkshire County Council, a plea for more equable grant assistance from central government to local authorities. He felt that "the affluent fat cats of the South" benefitted from DOE's policy that 100% grant to reclaim despoiled land could only be given for land that could be used for industrial purposes whereas areas in the North, and in Wales and parts of Scotland, were condemned to remain "the dustbin of the United Kingdom". *Kenneth Dunn,* Managing Director of the Incinerator Company, in his presentation of incineration of toxic and dangerous wastes, looked at the practical aspects of interest to local authorities and industry.

LONG RANGE TRANSPORT OF AIR POLLUTION

Following two fascinating and thought-provoking papers on long range transport of air pollution by *Dr. Ron Barnes* of Esso and *Dr. Tony Kallend,* of CERL, discussion centred on the adequacy of the present monitoring network system to show clearly the pattern of emission and deposition across national boundaries; and the possible future changes that might be brought about by increased use of coal in places as far-flung as the USA and Eastern Europe.

Councillor J.C. Blewitt of South Oxfordshire District Council raised a matter not actually on the agenda, but on the related subject of the transport of black smoke caused by stubble-burning. There have been widespread reports this year of nuisance caused by this seasonal agricultural practice and Councillor Blewitt's point was that the disadvantages to the general population now outweigh the advantages to the farming industry which was specifically excluded from clean air legislation regarding dark smoke emissions. He put forward a plea for the problem to be totally reconsidered by the National Society for Clean Air and for the present Code of Practice and model Bye-law to be re-examined, to make them both more effective in practice.

BRITAIN'S NUCLEAR FUTURE

The Open Session, on nuclear power, was intended to generate a lively debate and, in the event, it was fierce and somewhat one-sided. *Michael Gammon* of the CEGB, who presented a paper on "Planning our Nuclear Future", stated that he did not seek to make the case for nuclear power but wished to consider the forward planning necessary to develop a nuclear power station in the UK. *Robin Grove-White,* Director of CPRE, looked at the problem of public acceptability in relation to nuclear power and the points around which opposition would polarise in any public inquiry. The discussion revolved round the question of whether nuclear power was really needed at all, with proponents of low energy policies and alternative technologies taking a strong stand against nuclear generation of electricity, in support of Robin Grove-White's contention that the problems of public acceptability entailed by nuclear power ought to lead Government to promote urgently other non-nuclear solutions to Britain's long-term energy problems. Michael Gammon questioned the basis for such argument, pointing out the CEGB's remit was to provide electricity to the consumer in the best and most economical way and that the timescale for development of alternative technologies was very long-term.

In the end, both sides agreed that Conference should return to the subject at some future date, when the pattern of future fuel supplies and prices would be clearer.

1982 CONFERENCE

Next year the NSCA Conference visits Llandudno and will be held in the brand new Canolfan Aberconwy Centre (opening January 1982). Those who came to Brighton can expect a very similar hall with plenty of room for the planned exhibition at the back, and comfortable ultra-modern surroundings. It is hoped that the success at Brighton will be repeated in 1982 in Llandudno and that people will take the opportunity of meeting old friends and new, discussing new solutions to pollution problems and hearing excellent presentations from the highest level of speakers.

NATIONAL SOCIETY FOR CLEAN AIR
49th ANNUAL CONFERENCE
LLANDUDNO
18 – 21 OCTOBER 1982

Subjects will include – Use of Coal by Industry, Domestic Heating, Noise Abatement Zones, Neighbourhood Noise, Noise from Road Vehicles, Control of Construction Site Noise, Air Pollution Related Health Risks, Pollution in Buildings and Underground Facilities, Corrosion by Atmospheric Pollution on Materials, Atmospheric Pollution from the Agricultural and Quarrying Industries

Keynote Address to be given by Lord Flowers, FRS

The Conference and Exhibition will be held in the recently opened Conference Centre on the Seafront at Llandudno.

Conference Brochure available from NSCA at
136 NORTH STREET – BRIGHTON BN1 1RG
Telephone: Brighton (0273) 26313

INSTITUTION'S PRESIDENT APPOINTED TO ROYAL COMMISSION ON ENVIRONMENTAL POLLUTION

On the recommendation of the Prime Minister, the Queen has appointed Mr. A. Archer, M.B.E., F.I.E.H., a member of the Royal Commission on Environmental Pollution. Mr. Archer is the former Birmingham City Environmental Officer and is currently President of the Institution of Environmental Health Officers. He is also Chairman of the Steering Committee on Environmental Lead in Birmingham.

In 1980 he visited the United States to study the problem of lead-based paint poisoning among children. Mr. Archer's appointment on the Royal Commission is for three years from 2 November 1981.

EFFECTS OF AIR POLLUTION ON MATERIALS – AN INTERNATIONAL DEBATE

K.G. SAUNDERS+

INTRODUCTION

It is well known that the atmosphere plays a major role in the deterioration of materials. Common examples are the gradual erosion of historic monuments such as the statues on St. Pauls or the Charyatids in the Temple of Erecthion in the Acropolis and the corrosion of metals commonly experienced in structural steelwork. Atmospheric corrosion is usually prevented or reduced in the case of metals by the application of protective coatings such as paint, by using a self protecting metal alloy, such as stainless steel, or alternatively it is possible to design to take account of the expected corrosion rate.

Atmospheric corrosion will occur under normal weather conditions as a natural process. What is of current interest is the effect of air pollutants on this natural corrosion process and therefore what proportion of the overall cost of the damage is attributable to air pollutants.

The Commission for Energy and the Environment in their recent examination of the impact of coal combustion on the environment have identified atmospheric corrosion of materials as an area requiring more investigation. As a result of this interest and stimulated by the *UNECE Convention on Long Range Transboundary Pollution, a need has been identified to undertake work in this field in the UK.

UNECE INVOLVEMENT

An appraisal of the effects of sulphur compounds on materials has been designated first priority by the UNECE Working Group on Effects of Sulphur Compounds on the Environment. This Group of official delegates from the ECE Member Countries held its first session in Geneva in April 1981. It was set up by the Interim Executive Body (IEB) for the implementation of the Convention on Long Range Transboundary Air Pollution (LRTAP) which was signed by 34 UNECE countries late in 1979. The Convention stresses the need for data exchange and collection followed by evaluation before taking any action to abate emissions. For this first meeting of the Working Group the initial phase of data exchange and collection relating to economic materials was completed. Further assessment and evaluation is still to come. The first meeting discussed some of the problems of selection of suitable damage functions with relevant parameters (discussed below), their applicability internationally or nationally and the economic assessments of the resulting damage. However there was a polarization of views between the Scandinavian approach

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+ Dr. Saunders is a Planning Engineer in the Environmental Section of CEGB HQ and attended the UNECE meeting as a Technical Adviser to the UK delegation.

* UNECE – United Nations Economic Commission for Europe.

of using a simplified function applied internationally and the EEC, UK, and Eastern Bloc approach of using a function related to the physical processes involved in the corrosion in order to characterise national atmospheric corrosion conditions.

Gaps in knowledge were identified in areas including the effect of SO_2 on paint films, concrete, stone, electrical contacts, and the role of other pollutants such as NO_x, particulates etc. A new international survey was proposed to try to fill some of these gaps. However, disagreement arose over the draft conclusions and recommendations proposed by Norway and Finland. The EEC and UK delegations were unable to accept the Scandinavian approach. This resulted in the Working Group conclusions and recommendations being left as a draft to be discussed at the second session of the IEB in November 1981. However it is hoped that an acceptable definitive basis for establishing damage estimations will be produced in due course.

At the last IEB meeting it was recognised that atmospheric corrosion is a long term problem with many gaps in knowledge. In order therefore to speed up the work plan relating to the implementation of the Convention, it was agreed that the Working Group will also review the air pollution problems associated with soil, vegetation, groundwater and aquatic ecosystems by the end of 1982.

DAMAGE FUNCTIONS

Atmospheric deterioration of materials is a complex process and in order to make an economic assessment of damage from air pollutants, it is necessary to separate the naturally occurring corrosion from pollutant accelerated effects and to describe this by means of a function normally termed a ''damage function''. A damage function is a quantitative expression which sets out the relationship between the deterioration rate of a material and the factors affecting that rate. Derivation of a damage function is not an obvious or simple task as each site where material is exposed to the environment is affected by the various factors which make up the effective microclimate at that site including temperature, windspeed, rainfall duration and amount, surrounding topography, relative humidity and air pollutant concentrations.

The process of deterioration for many materials depends on the presence of a moisture film. In the case of metals, unless there is a high relative humidity so that such a water film will form, no electrochemical corrosion will occur even at very high SO_2 levels. This inter-relation of the parameters affecting corrosion must therefore be recognised in any damage function. Some of these points are raised in a comprehensive discussion of the problems in derivation and interpretation of damage functions given by Benarie (1980).

ECONOMIC ASPECTS

Considerable problems exist not only in deriving a meaningful damage function for a given material, but also in attributing a cost to that damage. For example, which materials are economically important? Concrete has a very large surface area exposed to the environment, and involves large tonnages of material with reasonably high labour costs, but is its corrosion rate fast enough to cause damage or erosion within the design lifetime and is it accelerated by air pollutants? How can damage to buildings and statuary forming part of the cultural heritage of a nation be costed? Is there in any case a threshold level for the concentration of air pollutants above which accelerated damage takes place?

It is easy to imagine the complications which occur when individual materials are considered. A further question is whether we should be costing in terms of energy costs as well as economic penalties? For instance, the removal of SO_2 at source would require an amount of energy which may, or may not be balanced by the energy for replacement or maintenance of the damage due to the air pollutant. In this decade, where the reality of basic energy requirements and costs are all too evident, the energy budget for any process should no longer be ignored.

Many of these questions do not have a simple answer and in any assessment compromises, assumptions and approximations have to be made. It is essential that as far as possible these are based on valid considerations and that uncertainties are minimised.

ATMOSPHERIC CORROSION SURVEYS

Many of the signatories to the UNECE Convention have been involved in the field of atmospheric corrosion for many years.

The early studies in the UK by Vernon (1935), Hudson and Stanners (1938, 1953, 1959) were pioneering work in this field. More recent (1965 -) studies have been influenced by the work in the USA and Canada (Sereda, Haynie and Upham *et al*) and by that in Czechoslovakia (Barton and Knotkova-Cermakova). Derivation of a damage function, based on a few key parameters, is gradually being adopted as the most productive approach. There are three methods for deriving these functions.

1. Statistical analysis of atmospheric corrosion survey results.
2. A theoretical derivation based on chemical kinetic considerations of the mechanism of corrosion.
3. A combination of 1 and 2.

The following is a brief guide to the approach in the United States, Europe, Eastern bloc countries and the UK. Studies have been carried out mainly on metals and the main pollutant measured is usually SO_2. The other materials considered economically important are paint and stone. These materials are only now being investigated systematically with a view to producing a damage function although many studies of their general atmospheric corrosion mechanisms have been made. For a complete economic damage assessment other materials such as paper, fibres, electrical equipment, polymers, are sometimes included but for this review only metals, paint and stone will be dealt with.

CORROSION SURVEYS

Metals

USSR

Recent work by Mikhailovskii (1980) (method 3) includes a survey at 8 sites in the *CMEA countries (1968-73 results). They have derived a damage function related to frequency of occurrence of a film of water (time of wetness), temperature and concentration of pollutants (Table 1), assuming that the corrosion rate of metals in a clean atmosphere can be approximated by a linear function (this is usually not accepted for steel). However, his predicted and experimental results are in reasonable agreement. His work suggests that the contribution of SO_2 to the corrosion rate for steel is 18% at an annual average of 17 $\mu g/m^3$ SO_2 and 79% at 116 $\mu g/m^3$ at an average temperature of 6.9°C.

* CMEA: Eastern bloc countries in the Council for Mutual Economic Aid.

Czechoslovakia

Barton *et al* carried out most of the early work and adopted ultimately the approach No. 3 of a combined theoretical and experimental treatment; the main parameters of interest being long term humidity and temperature measurements, and SO_2 concentrations (1973). They derived a function, listed in Table 1, with constants evaluated from long term corrosion tests. Some earlier work on 3 sites (1965-66) indicated a possible threshold effect of SO_2 since the corrosion rates were related to uniformly defined Relative Humidity and Temperature conditions. The threshold value quoted from this work is an average of 43 ug/m^3 SO_2 for steel with only slightly higher values for Zn and Cu (Barton 1973).

This work was developed by Knotkova-Cermakova (1974) who did a large survey involving 19 stations in North Bohemia. The details are given in Table 1. This survey used the concepts of a threshold level and that of a Corrosion Index via frequency of occurrence of RH $>$80% and (SO_2) either annual average values, cumulative, or daily average. The derived damage function given in Table 1 uses these parameters and the average corrosion temperature. These workers have also developed a mathematical model to try to overcome the limitations of the regression analysis approach.

Barton and Cherny (1980) also analysed the data from the CMEA countries survey reported above by Mikhailovskii. He produced a different function (Table 1) for the prediction of corrosion rates expressed in terms of the wetting time, t, and SO_2 concentration. This equation applies to steel, zinc and copper.

Germany

Germany has been involved in atmospheric corrosion since 1940 through the work of Schikorr. He is particularly known for his work on zinc. Atmospheric corrosion test results since 1940 are available in a variety of locations e.g. railway tunnels, under cover etc. Most work is classified according to site type either urban, rural, industrial, and marine. A compilation by Schikorr (1965) of worldwide corrosion rates indicate average rates to be

1 μm/y	2-7 μm/y	3-20 μm/y	1-7 μm/y
rural	urban	industrial	marine

A small corrosion survey was carried out by Swenk and Ternes 1968 on steel and alloyed steel at Duisburg and Geben Kirchen over a 4 year period but no further data are available.

Luckat has been an active worker interested in steel and stone. In 1974 a steel survey was carried out over 6000 hrs as shown in Table 1. No damage function was produced. However corrosion rates of steel sheets related to SO_2 are available. Unfortunately these are short term corrosion measurements not valid for long term predictions. Derived damage functions are listed in Table 1.

Norway

Norway has been very active in atmospheric corrosion studies for a range of materials both in the laboratory and in field surveys (Atteraas and Haagenrud 1980). Two main institutions have been involved, the Norwegian Institute for Air Research (NILU) and Veritas. A summary of some of their short and long term work is given in Table 2 with the damage functions produced. For economic assessments only long term corrosion data are used and these are given in a later section in Table 7. It is interesting to note that for the Long Range Transport of Air Pollution study at Birkenes it was concluded that although the monthly corrosion rate of carbon steel is influenced by episodes of acid precipitation these episodes occur too seldom to influence the long term corrosion rate.

Sweden

Sweden has also had a long term interest in corrosion which is exemplified by the work of the Swedish Corrosion Institute. The main workers in this field have been Dr. V. Kucera (1976) and Prof. E. Mattson.

Results (1958-65) have been reported from 3 sites using a range of materials as in Table 1 (Swedish Case Study 1972, Mattson and Holm 1968). However, no damage functions were derived. More recent corrosion rate measurements for Sweden are reported in the joint Scandinavian exercise and are described below. Some survey work on steel at 11 sites in Sweden has also been carried out by Mattson in 1968.

To enable some of the key parameters to be investigated in detail many interesting laboratory studies have been conducted at the University of Gothenburg under Prof. Vannenberg. The importance of wetting periods, SO_2 levels and the transport of SO_2 to the corroding surface have been investigated (Sydberger and Ericsson 1980).

Finland

Finland has generally very low SO_2 levels (Table 1 for details) and only metal corrosion has been reported (Hakkarainen *et al* 1980). Two year averages for 5 test sites are given. In this study, time of wetness was taken as the time with Relative Humidity $>$85%. The damage functions produced from a total of 4 years data are given in Table 1. In this work there appears to be no evidence for a threshold SO_2 effect but it is the case that the rates measured are low and the significance of SO_2 not necessarily great.

Combined Scandinavian Study

In 1975 a co-operative study between Finland, Sweden and Norway was undertaken at 32 sites using steel and zinc. The purpose of the programme was to map the relative corrosivity of Scandinavia and to seek correlations between corrosivity and atmospheric conditions. The details of the survey and the derived damage functions are given in Table 1 (Nordforsk Project, 1978, 1980).

USA

The United States during the decade 1970-80 have been particularly active and systematic in their approach to the problems of an economic appraisal of damage. Many laboratory and field surveys have been carried out and incorporated in a series of economic assessments. To some extent the degree of interest shown by UNECE in this problem was stimulated by this American activity. Details of some of these studies are shown in Table 3. A feature of the work is that although few sites were used the associated pollution and meteorological data is comprehensive. Laboratory studies have been undertaken to fill gaps in knowledge and investigate various pollutant effects under defined conditions (Haynie *et al* 1976, Mansfeld 1980).

Canada

Sereda (1958) has been a pioneer in work on atmospheric corrosion. He introduced the concept of time of wetness of a material, i.e. when corrosion occurs due to the presence of a thin film of water, and in addition introduced techniques whereby this quantity could be measured.

With Guttman a number of interesting surveys were undertaken and some of these are given in Table 3 (Sereda and Guttman 1968, Guttman 1968).

UK

From the early mechanistic studies of Vernon (1935) and atmospheric corrosion surveys by Hudson and Stanners (1953, 1959), the UK has been involved in the problems of atmospheric corrosion. Many small scale surveys have been performed for zinc and steel and in 1968 Chandler and Kilcullen produced a simple damage function for sites round Sheffield. The impetus for this interest in corrosion has been twofold. Measurement of corrosion rates allows the design of maintenance free structures and the possibility of a measure of the corrosivity of the environment would allow prediction of future trends in rates. In the UK a major area of exposed metalwork is transmission towers or pylons for the electricity distribution system. Corrosion protection is by galvanizing to BS729 (610 g/m^2 Zn). On average the surface area of each tower is 550 m^2 and the total average accumulated area exposed is approximately 13 x 10^6 m^2. A comprehensive survey was therefore carried out in collaboration with the Construction Industries Research and Information Association from 1969-1975 using zinc cans as a reference material (Shaw, CEGB 1978). The survey involved over 3000 sites providing a corrosion map of Zn corrosion rates averaged over 4 years for 10 x 10 km^2 areas for the whole of the UK. Where possible the sites were chosen to provide corresponding meteorological and pollution data including SO_2 in addition to details of each individual exposure site. These data therefore provide the most comprehensive and statistically valid data base for assessment of the important parameters affecting corrosion, investigation of evidence for threshold levels for damage, and the derivation of damage functions, possibly on a regional basis within the UK. Although no damage function is available at present the data is being computerised and statistical analysis is being undertaken by the CEGB using primary and combined parameters.

Some other UK surveys are summarised in Table 4.

Paint

The problems associated with quantifying and measuring paint damage by pollutants has inhibited to a large extent the development of realistic damage functions for paint. Although paint manufacturers have been carrying out comparative paint testing for many years these studies do not attribute damage to air pollutants. Further problems arise in the myriad combinations of pigment, carrier and solvent types and loadings in the paint films. Surface preparation cannot necessarily be taken into account in any damage assessment but will nevertheless be a major factor in paint protection failure.

The activities of various countries in this field are summarised as follows.

USA

A great deal of work has been carried out in the United States on this topic starting with some very crude estimates illustrated by the work of Fink *et al* (1971). They estimated paint life in an urban and rural area and without establishing any cause and effect relationship, equated the loss in paint life to the difference in SO_2 concentrations. As knowledge has progressed other estimates have been made (Haynie and Spence, 1972) culminating in a controlled laboratory study on paint systems (Haynie *et al*, 1976, Mansfeld 1981).

Norway

NILU started testing corrosion protection systems in 1976. 57 different protective systems consisting of metallized steel, metallized and painted, and painted steel have been tested on 6 sites. After 2½ years more than 1/3 of the paint coatings were significantly affected and the effect correlated to the type of environment. Table 2 gives details of the results of the programme so far (Haagenrud *et al* 1981).

Sweden

The Swedish Corrosion Institute in the 1972 Case Study to the UN included effects on Painted Steel and Painted Woodwork. Paint lifetimes were compared in urban and rural atmospheres e.g. 10 years in a rural area compared to 8 years in an urban area.

UK

In common with many of the UNECE countries there is very little information on the effect of air pollutants on paint. At present a small corrosion survey at well monitored sites is being initiated by the CEGB using representative candidate paint/paint systems. New methods of quantitative damage assessment on paint are being investigated (Table 6).

Stone

No quantitative damage function for stone exists.

General stone deterioration has been studied in Germany, Italy, Greece, France and new surveys are being initiated in the UK and USA.

Luckat in Germany, in addition to studies on Koln Cathedral, has been responsible for the co-ordinated stone corrosion survey under the auspices of the NATO-CCMS programme. Nine countries have been involved in exposing three stone types with SO_2, nitrogen oxides, chloride and fluoride, measurements being made by the IRMA technique. (Table 5.)

France has been involved in stone corrosion since 1965 with studies at St. Louis des Invalides in Paris (urban), Saint Jean d'Aubeure (rural), at La Rochelle (marine) and Strasbourg Cathedral (sandstone in urban environment). There is also a study to investigate the impact of pollution on old Bordeaux. Samples of 10 stone types have been exposed.

The concern of Italy on the problems of stone corrosion is reflected in their work in Venice, Rome and other cities. Venice is characterised by high relative humidity and chloride while Rome has a high volume of traffic NO_x emissions.

In Greece, the Committee for the Preservation of the Acropolis has been very active and a new survey has been initiated in 1980 on approximately 20 materials including the Zn can (UK (Shaw) contribution), Cu, Al, Steel, Stainless Steel, building materials, ceramics, on about 12 sites.

Within the UK a new stone corrosion survey involving the exposure of two stone types in SE England is being carried out by Bedford College, University of London in conjunction with the Building Research Station. Results are expected in 1983. Some details are listed in Table 5. The BRS/Bedford College collaboration also extends to a study of the effect of rain and its impurities on the corrosion rate of the roof balustrade stonework at St. Paul's Cathedral.

A new study by the US Office of Research and Development on the effects of acid precipitation on stone monuments and statuary and protection methods against such damage is now in progress. The marble headstones in the National cemeteries which are relatively standardised throughout the United States will be examined for loss of detail and surface erosion. The data will be correlated with air pollution and meteorological records.

CEGB INVOLVEMENT

The CEGB is currently initiating a pilot study of atmospheric corrosion on zinc cans, paint systems and stone. Part of the stone survey is in collaboration with Bedford College while part is with the Building Research Station. The sites chosen are well monitored locations in South Eastern Region and Midlands Region. Measured pollutants will include SO_2, NO_x, chloride, rain acidity and meteorological factors such as windspeed, rainfall, and relative humidity. Time of wetness will be also continuously measured using the ASTM approved meter developed by Sereda. This is an experimental project to run for at least one year to investigate a series of materials by measuring a wide range of damage indicators and important corrosion parameters. The possibility of extending the survey to a selection of sites representative of the UK is being explored with the support of the Department of the Environment. CEGB activities are summarised in Table 6.

ECONOMIC ASSESSMENTS

There are many possible approaches to the economic assessment of damage once a damage function has been established. However in some areas no suitable functions exist and in others comparative or arbitrary estimations have been made. Without dwelling on the methods used and uncertainties involved it is sufficient to say that significant improvements can still be made in this area. Some of the studies carried out over the past decade are tabulated (Table 7). The estimated costs have all been tabulated where possible at both 1970 and 1979 prices and have been given for corrosion and metal protection for comparability. Some of the US studies have involved a re-interpretation of the same data base. It can be seen that there is a very wide variation in estimated costs and attempts must be made to make reasonable judgements on the validity of some of these estimates.

Recent attention has been given to a methodological Study published by OECD on the costs and benefits of SO_x control. There are a number of factors to be noted in the section on materials. The damage function derived for zinc corrosion was based on 1953 Hudson and Stanners data for 16 UK sites, and is a simple linear function relating corrosion rate to SO_2 concentrations. It does not take into account time of wetness and assumes that there is almost no variation in this parameter or in other atmospheric factors for the whole of Europe and is therefore applied to each country in turn.

In addition, as noted earlier, the cause and effect relationships for paint and SO_2 are least well defined. Other factors affecting paint life such as particulates, Ultra Violet Radiation and time of wetness have not been taken into account in the OECD work. In fact the damage function is based on the early poorly quantified work by Fink *et al* in 1971.

For the UK, taking 1953 data for 16 sites as used by the OECD is not appropriate when over 3000 measurements for the whole of the UK in the Shaw Corrosion Map 1969-75 can be used to give a statistically valid picture. A damage function using this data is therefore currently being derived by the CEGB as mentioned earlier. The assumption that damage functions using one parameter and covering all international conditions can be used rather than those related to the individual national climatalogical and industrial characteristics is also open to question. Nevertheless, as a methodological study the OECD points the way for future work.

ADDITIONAL BENEFITS

From the overall corrosion point of view an additional bonus of this type of work is the production of an index of corrosion or measure of corrosivity of the atmosphere which would allow predictions of behaviour of materials under various atmospheric conditions. This type of index is being advocated in the International Standards Organisation and could eventually be incorporated in codes of practice. Such indices would be used for the design of minimum maintenance structures and avoid many of the costs and problems currently encountered when environmental considerations are neglected.

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Table 1 ATMOSPHERIC CORROSION SURVEYS AND DAMAGE FUNCTIONS

COUNTRY	DATE	TYPE	MATERIALS	PARAMETERS	FUNCTION
USSR Mikhailovskii (1980)	(1968 73)	Model of metal corrosion in atmosphere based on meteorological and aerochemical factors	Zn Steel Cu Al Mg alloy	8 sites CMEA $-15^oC < t < 30^oC$ $80\% < RH < 100\%$, (SO_2), (Cl^-)	$K = [(A + \alpha t) + (B + \gamma t_i)$ $+27.5$ $(C^{SO_2} - C^o)] \times \Sigma R$ -2.5 $g/m^2/y$
CSSR Barton (1973)	1966	Combined empirical and theoretical approach	Steel Zn Cu	3 sites t_w, T SO_2	Threshold level
	1973	nomograph		long term RH>80% T 0^oC	$v_k = Mt^nS^m$
Knotkova - Cermakova	1974	As above + Corrosion Index concept V_1Z_1 etc. Frequency of<80% RH $x(SO_2)$ ave, daily, cuml. (V_1Z_1)	FE Zn Cu Al	19 stations N Bohemia Met data, tW, RH, (SO_2), T Total SO_2, Cl^-	$v = k_1(H_2)^k \exp(k_3 + k_4 S)$
Barton	1980	Relation between steady corrosion rate, wetting time and atmospheric pollution	Zn Steel Cu	8 sites CMEA	$k = Mt^{n1}SO_2^{n2}$
GERMANY Schwenk & Ternes	1968 4y	Survey		2 Sites T, Corr rate	
Luckat	1974 6000 hours	Survey	Steel 1623	Cl^-, F^- SO_2 RH	No EQ^N
Schikorr	1940-	Atmospheric Corrosion Rate Measurements	Zn	railway tunnels etc.	Corr. Rates
Western Ruhr Oberhausen			SO_2, Steel Corr. Rate $x_{max} = 155\ mgSO_2/m^2/d$		Rate = 0.0106x + 2.0 (Western Rhur)
SWEDEN Mattson	1968	Corrosion Survey	Cu and Alloys	1 site	Correlation S in precipitation and corrosion rates

Kucera (Swedish Case Study 1972 Mattson and Holm 1968)	1958-65	Corrosion Rates measured and Comparison of Lifetimes made.	[SO_2] 1-50 $\mu gSO_2/m^3$ Steel Galvanized Steel Ni plated Steel S Steel Aluminium Painted Woodwork Painted Steel	3 SITES	Lifetimes measured
SCANDINAVIAN STUDY					
CO-ORDINATED NORDFORSK STUDY (1978, 1980)	(1975-)	Survey and Damage Functions	Zinc Steel $SO_2 = g/m^3$ $Cl = g/m^2/y$	5 FINLAND MET DATA 6 SWEDEN AIR POLLN 19 NORWAY DATA	ANN $K_{STEEL} = 5.28SO_2 + 176.6$ RATES $g/m^2/y$ $K_{ZINC} = 0.22SO_2 + 6.0$ $K_{ZINC} = 0.27Cl + 0.22SO_2 + 4.5$ (better correln)
FINLAND					
Hakkarainen and Ylasaari	(1980)	Survey and Functions	Steel Zinc A1 Cu SS	5 SITES S FINLAND <10 $\mu g/m^3$ rural 20-30 $\mu g/m^3$ urban >300 $\mu g/m^3$ daily mean at few industrial sites 4y (2y averages)	STEEL, $y = 1.17\ t_w^{0.66}(SO_2 + 0.048)$ ZINC, $y = 0.0049\ t_w^{0.91}(SO_2 + 0.05)$

USSR KEY

K = Total corrosion rate
t = Temperature
R = Duration of phase film of water hrs/y
= temperature coefficient of increased rate
A = Corrosion Rate under atmospheric conditions
B = Corrosion Rate SO_2
CSO_2 = average content of SO_2
= temperature coefficient of increased rate from SO_2

CSSR

V = rate of corrosion
Mnm from statistics $S = (SO_2)mg/m^2/dy$
H_2 = occurrence of RH 80%
$kk_1k_3k_4$ are constants.
n_1n_2 are constants
k = corrosion rate
t = wetting time

GERMANY

corr. rate (gFe/m^2d) is the ann. average of 14 day initial corrosion rates.
x = SO_2 immission or uptake rate ($mgSO_2/m^2/d$) ann. average of 14 day values.
T = temperature
C1 = chloride concentration
F = fluoride concentration
RH = Relative Humidity

y is corrosion rate in um/year

t_w = time of wetness when RH 85%

Table 2 – NORWEGIAN DAMAGE FUNCTIONS/SURVEYS

PROJECT	DETAILS	FUNCTIONS
1. 3 sites 1974-79 25 MONTHLY MEASUREMENTS	Birkenes – rural (<$20\mu g/m^3 SO_2$) Alvim – urban ($20\text{-}40\mu g/m^3 CO_2$) Borregaard – industrial (≈$80\mu g/m^3$) (2-3km from Alvim)	*MONTHLY CORR RATE* STEEL $K_{STEEL} = 1.54SO_2 + 2.34\ NPREC + 0.05H^+ - 15.2$ ZINC $K_{ZINC} = 0.03SO_2 + 0.01RH > 90\% + 1.6$
2. LRTAP study	1 site Birkenes SO_2 levels pH of rain Steel Zinc	MONTHLY $K_{STEEL} = 2.3M.S.95 + 1.0SO_2 + 0.01Cl + 0.1$ NO CORRELATION FOR ZINC
4. WORLDWIDE	31 sites Norway 1979- Sweden C. Steel Guadaloupe Zinc Japan 1 year Egypt CSSR	To be evaluated
5. NORWAY (Haagenrud et al 1981)	6 sites Metallized 1976- Metallized + Painted 1½, 3½, 7yr Painted exposure Total 57 systems	urban indust. DAMAGE marine RATINGS rural SYSTEM

NPREC = days with Precipitation
H^+ = concentration strong acid
RH = Relative Humidity

M.S.95 (DAILY amt precipitation pH<4) x (hours>95%RH)
SO_2 in $\mu g/m^3$
Cl = deposition Cl^- in precipitation mg/m^2

Table 3

USA Mansfeld
Haynie et al
Legault and
Haynie and
Haynie and
Haynie and
CANADA Guttman
Guttman anc

Table 4 UK ATMOSPHERIC CORROSION SURVEYS AND DAMAGE FUNCTIONS

	DATE	TYPE	MATERIALS	PARAMETERS	FUNCTION
Hudson	1938	Survey	Zn	6 Sites	No Function
	1959	Survey	Zn	4 Sites	No Function
Hudson and Stanners	1953	Survey	Zn	16 Sites	No Function
Chandler and Kilcullen	1968	Survey	Steel	22 Sites SO_2/Smoke Daily Average	SO_2 Account for only ½ Variation Observed Average Steel Corrosion Rate = $(0.67 + 0.008\ SO_2)$ in mils/year
Evans, T.E.	1972	Survey Birmingham	Ni	1 Site	No Function
Hutchins and McKenzie	1974	Survey	Zn Steel	6 Sites	No Function
Shaw, T.R.	1965-66	Survey	Zn Can	25 Sites	No Function
Shaw, T.R.	1969-75	Survey	Zn Can	3182 Sites Some Met Data and SO_2 Data	Corrosion Map of UK
	1975-80		Zn Cans Steel Plates	80 Sites	Function to be Calculated by CEGB
CEGB Activities	1981	Table 6			

Table 5 STONE SURVEYS

NATO-CCMS	3 types stone SO_2 by absorption method (IRMA)		
GFR	Specific Monuments	Cologne Cathedral	
France 1965-	Specific Monuments	St. Louis des Invalides, Paris Saint Jean d'Aubeure La Rochelle Strasbourg Cathedral	Urban Rural Marine (Sandstone/Urban)
	Old Bordeaux		
Italy	Rome Venice		RH, Cl^-, NO_x
UK	Specific Monuments	St. Paul's Wells Cathedral Winchester Cathedral and Others	
Bedford College 1981	SE England	2 stone types Sites Including 4 fully monitored CEGB sites	
Greece 1980	~12 sites	~20 materials	
USA 1979	Appalachian Far West North East	Marble headstones 12 cemeteries	Air pollution Met factors

RH = Relative Humidity
Cl^- = Chloride Concentration
NO_x = Nitrogen Oxides

Table 6 CURRENT CEGB ATMOSPHERIC CORROSION PROJECTS

PROJECT	REGION	DATA	DATE	PARAMETERS
1. Statistical Analysis	UK	Shaw Corrosion Data	1969-1980	DRI, Exp I. T, R, RH, SO_2, pH, wind, combined parameters
2. Corrosion Surveys on Well Monitored Sites		Corrosion Rates for Zn can, 2 paint systems (Alkyd, Chlor-Rubber), Building Stone (Limestone, in conjunction with Bedford Coll/BRE) Concrete	1981	*South East Sites* Met Data as above. CTS Measure SO_2, t_w, (all Sites) NO_x, NO_2, H/C
4 sites	South East			*Some Sites* H/C Particulates
4 sites	Midlands			*Midlands Sites* cts SO_2, NO, NO_2, O_3, HCL, pH. Met data. tw.

T: Temperature
RH: Relative Humidity
pH: Rain Acidity
R: Rainfall
tw: Time of Wetness
DRI: Driving Rain Index (Lacy 1971)
Exp I: Exposure Index (BS5618, 1978)
H/C: Hydrocarbon

Table 7 ECONOMIC ASSESSMENTS (1970-81)

COUNTRY	STUDY	DAMAGE FUNCTION	CORROSION AND METAL PROTECTION COSTS
Norway	1979 Henriksen et al	$y = 0.45\ SO_2 + 0.7$ (galvanised steel)	989 mill kr (1979)
		$L_1 = 11.7 - 0.042\ (SO_2)$ (painted steel)	
		Cost saving for 40% SO_2 reduction is .. .. $SO_2 = 0$ .. is	15.7m kr (1979) 77.7m kr (1979)
		L life of paint layer	
UK	1972 PAU Report	Comparison between polluted unpolluted areas	£42m (1970); (£128m(1979))
OECD	1981 Costs and benefits of SO_x control	$y - 0.204\ (SO_2) + 2.46\ (Zn)$ $L_1 = 11.6 - 0.016\ (SO_2)$ (Fink 1971) painted steel $L_2 = 15.3\ \ 0.031\ (SO_2)$ painted galv. steel	All Countries Costs: (for Base Case) $20,247 x 10^6 (1979) ($6,617 x 10^6 (1970) UK Costs: (Base Case) £2,252m (1979) (£736m (1970))
Netherlands	1980 Institute of Environmental Studies	$y = 0.001\ (RH\ \ 50)\ SO_2$ (Zn Haynie & Upham 1970) $L_1 = 10.2\ \ 0.02\ SO_2$ (painted steel)	110 million Dutch Florins (1970) 200 million Dutch Florins (1980) for future doubling of emissions
USA	1970 Salmon	Ranking of Materials According to Chemical Deterioration and Economic Value	~$2000 x 10^6 (1970, Zinc and Paint) (~$6000, 1979) Zn $778 x 10^6 (1970) (~$2381, 1979)
	1971 Fink et al	Comparison of polluted unpolluted areas	$1450 x 10^6 (1970) ($4437 x 10^6 (1979)
	1974 Waddell	Review and Evaluation	$400 x 10^6 (base on Gillette) ($1224 x 10^6, 1979)
	1975 Gillette	Damage Functions Used	$400 x 10^6
	1976 Lui and Yu	Review and Evaluation based on Damage Functions (Haynie and Upham 1970, 1975)	$328 x 10^6 Zinc ($1004 x 10^6, 1979) $625 x 10^6 Paint ($1912 x 19^6, 1979)
	1979 Freeman	Critical Review	$400 x 10^6 (based on Gillette)
Sweden	1970 Kucera	Rates from 1958 65 Corrosion Studies	$475m Total ($1454m, 1979) $35m SO_2 Damage ($107m, 1979)

Approximate Conversions on 1970 1979 prices based on Retail Price Index for UK.

PRESIDENTIAL ADDRESS

Delivered at the Opening Session of Conference, Brighton 1981

Naomi E.S. McIntosh

The Society's President, Naomi McIntosh

I do not know quite how I was picked for the job of President of the Society, but I am immensely honoured to have been asked, and if I can do something half as useful as Sir Derek Ezra has been doing for the last two years, then perhaps I will be able to help the Society. The title of the Society has the immense virtue, for me, of using clear and simple English. Clean air is something everybody can understand. I tried the title on my sons, who were a bit baffled about why I was coming to Brighton. We talked about smoke from coal fires and went on to cars, when my 19 year old son said "But you drive". So I came down here on the train! However, he was right; in the world in which this Society operates and in which we all live, we all want to have our cake and eat it.

The discussion with my sons also reminded me of the great London smogs to which Lord Avon referred in his Address, and I recalled what it was like to live in London at that time. My main memory is that my father was usually very ill every winter with bronchitis and pneumonia – so ill that I thought of him as an old, sick man. However, when I worked out how old he was then, I realised that my father was a year younger than I am now. We never thought that he would survive, but he is still alive and well, never ill in the winter, and is still working full time at the age of 75. He survived simply because of the changes introduced by the 1956 Clean Air Act. Thinking about that caused me to reflect on memory, history, education, our children and the task that is now to be done. Anyone a decade or so younger than me would not remember the smogs and their effects. It is, therefore, very important to broaden the age range and sex balance of representatives to the Society, if we are to go forward to look at the problems likely to confront us in the future. We must not and cannot be complacent.

Turning to the work of the Commission on Energy and the Environment, as you will know we published our report 'Coal and the Environment' on 30 September 1981. It was the result of about two and a half years of very detailed work, covering a wide range of issues on coal production, supply, use, conversion to other fuels, and the associated environmental and planning issues. Evidence was contributed by a large number of people — 74 organisations and individuals, including the local authority associations and many individual councils. The Commission also undertook a number of visits around England, Wales and Scotland, which involved discussions with many more local authorities.

The Commission, as its name implies, was to advise on the interaction between energy policy and the environment. Our approach is (as we say early on in the report) perhaps best characterised in a quotation from Lord Nathan in his report 'Energy and the Environment' (1974). "A policy for the development of energy resources must be created in the context of its environmental and social consequences. Protection of the environment cannot be separated from the other objects of a policy for energy. The present skirmishing between environmental interests and the energy interests benefits neither side". We took that as our starting point.

We also had a variety of other commitments. We did not meet in public as the Energy Commission then did, but we were very open in receiving evidence from everybody and we decided that all the evidence submitted to us should be made available to people through the office at the Public Records Office and libraries. We were, and are, very keen to encourage more open debate, a point I shall return to.

The further we progressed in our study, the more we became convinced that energy policy could not be made in isolation and that every decision was likely to involve industrial, social and political objectives as well as environmental ones. We therefore examined not only the environmental consequences, but also a range of energy and other issues. We got into debates about how far to go, about what was really a social effect, about where we should draw the line. I think if we had taken the broadest definitions that some of us were arguing for at some stages, we might have still been sitting, the report would have weighed about double and it would probably have cost at least £50, instead of £23.

In the event, we were extremely grateful to Sir Derek Ezra and his colleagues for the input of information and the co-operation that we received at all stages. Indeed, that goes for all the other industries involved. We had some meetings at which representatives of the Central Electricity Generating Board, British Gas, British Rail and the Coal Board were all ranked along one side of a table, all discussing common issues. They admitted that they never normally got together to discuss such matters. In that sense, we believed that we were doing something quite important for the country. I know that Sir Derek and I share a common view that it was a pity that the Energy Commission was abolished. It may not have been a perfect forum for discussing energy policy, but it was one in which all parties to the energy debate came together. Energy is an area of immense importance to the country and at the moment we do not have such a forum.

Turning to the Commission's perspective, we were looking ahead at developments over the next 20 years. Many of us started out with the conventional image that coal was difficult and dangerous to mine, that it inevitably caused environmental stress, that it was dirty and inconvenient to burn, contributing to air pollution and ash as residues to be absorbed into the environment. At the end of our study, our conclusions were, in the words of our Chairman Lord Flowers,'hopeful'. We did indeed find features of coal mining and its use which posed serious problems, particularly opencast mining. We were worried about carving up yet more acres of the little that is left in Yorkshire. One of the serious features of such mining is that for every tonne of coal mined, about a tonne of spoil is also produced. That fact is very alarming, as are some aspects of subsidence, for example, people being left for several years with cracks in their houses.

However, aside from opencast mining about which we made a range of recommendations, we did end up believing that the worst features of coal production and use are basically an inheritance from times past. We were particularly reassured by the progress which is really reflected in the contrast between previous standards and the standards to which new projects — such as the Vale of Belvoir — are being planned and executed. Our overall conclusions are therefore definitely hopeful, both for the coal industry and for coal prospects generally.

This Society, of course, has a particular interest in what the Commission says about air pollution from coal combustion. Many members of the Society, in their local authority roles, are interested in the problems that may or may not arise from the largest anticipated increase in coal-burn, in the industrial sector; where, apart from the major industries which are looked after by the Alkali Inspectorate, local authorities of course have the main regulatory role. Examinations of air pollution or any other effects of coal combustion, and the adequacy of controls, must of course take into account the fact that any major social activity is likely to have bad effects as well as good ones. Absolute safety is just as impossible to guarantee with the combustion of coal as it is with the generation of electricity, either by nuclear or by other means. There are costs and benefits in living in any industrial society and, while every effort must be made to limit the impacts and the incidents of impact on health, few people would want to go back to living in a pre-industrial society. Therefore the costs of living in an industrial society must be balanced against the benefits of the rising standard of living, reduced infant mortality, better health, and all the other things which, when we choose to remember it, we know are plusses.

The major adverse health effects of air pollution from coal combustion arose from the combination of smoke and sulphur dioxide, levels of which, particularly smoke, have been greatly reduced in the last 30 years. One member of the Commission, Sir Richard Doll, pointed out that the reduction of smoke and sulphur dioxide has really resulted in the disappearance of acute effects on health, and that the incidence of long-term chronic effects has been substantially reduced. Nevertheless, we concluded that it was absolutely imperative not to be complacent and that we have to keep smoke pollution down to the lowest practicable level, come what may.

Sir Richard also said, at the Press Conference which launched our report, that the amount of lung cancer due to smoke produced in the absence of cigarette smoking is so low as to be virtually impossible to measure. If nobody smoked cigarettes, the damage from coal smoke would be much, much less, about 10-20 cases a year, rather than at the present level of 150-200 cases a year. The synergistic way in which coal smoke interacts with cigarette smoking is an important factor which I think is probably not very well understood.

Coming back to the role of local authorities, they are going to be particularly important in ensuring that the increase in coal use, desirable though it is from an energy point of view, does not put at risk all our post-war progress on environmental protection as embodied in the Clean Air Acts, the Town and Country Planning Act and the Control of Pollution Act. We concluded in the Commission that there need not be a backward step in air quality but we felt we had to emphasise four things. Firstly that we were not entirely satisfied that local authorities were properly aware of the likelihood of the increase, particularly in industrial coal use, over the next 10 or 20 years. Local authorities have got to become aware of and plan for a possible quadrupling of use in industrial coal-burn by the year 2000. We think that monitoring of levels of smoke, sulphur dioxide and other pollutants must continue. Individually one pollutant may not be dangerous, but, where there is a build-up from a multisource, it is absolutely necessary to keep a careful check on levels of air pollution.

Another possibility is a return to domestic coal burning. People like myself may not welcome the labour involved in cleaning the grates, but if coal continues to be the cheapest option, it might be important for them to have the choice of cleaning the grates, if in that way they can keep warm more cheaply. But if coal is going to be burnt in people's houses, it is absolutely imperative that the very good work going on at the Coal Board's Research Centre, Stoke Orchard, into smoke-eating appliances which burn *ordinary* coal in a smokeless way, continues. It is also important that as those new smoke-reducing appliances are brought on the market, their performance is carefully monitored and that they are used on an experimental basis before their use becomes widespread.

In principle, we believe there is a wide range of controls available to maintain air quality and that, provided these controls continue to be used and the action I have outlined is enforced, we think that there will not be any great problem. The point is not to get complacent about it. The problem is to find the right balance between the advantages and disadvantages and the costs and benefits. What looks as if it is a right balance to some people, looks quite different to others. One balance might look right if you are a local authority councillor; another might look right if you are part of the producing industries, and yet another balance might look right if you are a consumer trying to afford your coal, gas or electricity bill. The balance looks different again if you are a local resident with the pollution in your neighbourhood. When we try to weigh things in a balance, it is relatively easy to measure some costs, but difficult to measure others. It is reasonably easy to measure the cost of putting an extra few feet on the height of chimneys in the Bedfordshire brickfields. It is less easy to put a value on light, and even more difficult to put a value on intelligence.

A fairly key chapter at the end of the report, entitled "Reconciling Interests", was originally called "Reconciling Conflicts". I asked for the title to be changed to "Reconciling Different Interests" because different groups in the community do have different interests; that is inevitable and we need to discuss these differences and understand them. The particular problem, in relation to energy and to pollution, often comes in terms of balancing local interests against national interests and national needs. Everybody wants to be warm but nobody wants the coal mine next door, nobody wants the nuclear plant, nobody wants the SNG plant — or even the CHP plant, which is the favoured child of most of the environmental lobbies. Nobody wants any of these next to them. But everybody still wants to be warm and they want to be warm very cheaply.

How do we reconcile these different sorts of interests? I do not at the moment have any answers, but I am convinced that it is to the benefit of all of us to have much more open discussion about these different interests and try to work out what is in the genuine interest of the larger part of the community.

One problem, not so much in this country as in the USA, is that the development of single interest pressure groups, very often locally based, is very difficult to cope with when you are trying to reconcile these different interests. What people in such single interest groups usually have in common is that they are usually fighting *against* other things rather than *for* something and they coalesce simply to fight that problem at that time. They are not usually sharing a long-term goal and a long-term interest. They can of course fight and win very valuable battles. However, if they succeed, it very often means that the self-interest of a small group has overridden the interests of the silent majority. I think that is really quite dangerous.

The climate of opinion that we identify in the report is one in which we believe that people want open discussion, that people are no longer prepared to accept the judgement of experts, of politicians and of administrators. There was a general concern that decisions should be taken and be seen to be taken "reasonably, openly and fairly"; that local interests have to be reconciled with national interests. All of this requires more information and more education about the issues that are involved and about the choices that have to be made.

In conclusion, of my two or three major points, the first is that I really do believe that we must not be complacent. There is a major task to be done in remembering why we are where we are, and in looking to the future. This Society has a particular responsibility to keep people informed about the issues and about the choices involved.

Governments have the really vital role of stimulating debate about national energy into which we can place the framework of our discussions and arguments. My second point is that we cannot have our cake and eat it. We have to make conscious decisions about what we do and live with them. Important choices have to be made. They affect our lives and the lives of our children.

My new job is with a new national telelvision channel, mandated to spend 15% of its air time on "things educational". I believe that this is a good thing since, in comparison with other democratic countries, this country is profoundly under-educated. We really have to be better informed about these issues and be more active in the way that we take responsibility for our own decisions about them. For my part, if I can use my new role on Channel Four in helping to create a better informed debate and achieving better decisions about these issues in the country over the next year or so, then I look forward to making that contribution to your work.

NSCA DIARY January – March 1982

11 February	**a.m.**	Conference & Promotions Committee Meeting, 1100
(Thursday)	**p.m.**	Finance & Administration Committee Meeting, 1415
18 February	**a.m.**	Parliamentary & Local Government Committee Meeting, 1115
(Thursday)	**p.m.**	Technical Committee Meeting, 1415
11 March (Thursday)	**p.m.**	Council Meeting, 1415
24 & 25 March		NSCA Workshop – Industrial Air Pollution: Local Problems and National Policies. Nottingham University

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DIVISIONAL NEWS

NORTHERN DIVISION

Forty-seven members attended the Autumn meeting of the Northern Division held in the Civic Centre at Newcastle upon Tyne on 27th November.

The Chairman, Councillor Poole, was congratulated on his appointment as Vice Chairman to the Society and the members discussed various topics under consideration by the General Council and the principal Committees. The Secretary reminded local authority representatives of the need to complete and return the questionnaire on the sale of bituminous coal in smoke control areas.

The Chairman welcomed Dr. H. Forrest, Works Manager, Associated Lead Manufacturers Ltd., Elswick Works, Newcastle upon Tyne, who gave a talk on the uses and secondary refining of lead and the measures adopted to protect work people and the public against exposure to lead.

Dr. Forrest commenced with a slide presentation prepared by his company for the

Newcastle City 900 celebrations and which described the main properties of lead and outlined the various measures adopted at Elswick Works to protect the health of the staff, etc. Dr. Forrest spoke at some length pointing out the amount of money spent to reduce lead emissions to the air and into the Tyne and produced various statistics to prove how much conditions had improved over the past decade.

At the end of the talk questions were raised on the value to the industry of tetra ethyl lead, the use of lead in teeth as a measure of absorption rather than blood, lead levels in sheep offal, the transportation of lead on workers' clothing, concentrations of suspended lead in the general environment, the technique of testing for lead emissions, etc. which Dr. Forrest replied to.

Mr. N. Gray, Langbaurgh B.C., expressed the thanks of the Division to Dr. Forrest and to his colleague, Mr. Cotters.

C.R. Cresswell
Hon. Secretary

EAST MIDLANDS DIVISION

Report of a meeting held at Buxton on 10 September 1981

In the absence of both the Chairman and Deputy Chairman, the Chair was taken by Councillor W.R. Cashmore who welcomed members to Buxton and then introduced the Mayor of High Peak, Councillor David Holton, who extended a Civic Welcome to the members. Councillor Holton was suitably thanked by the Chairman.

Apologies for absence were received from the Chairman (Mr. C.W. Stacey D.F.C.) Councillor R. Chamberlain, Mr. H.M. Clayton, Mr. K.R. Enderby, Fenland District Council, Councillor R. Ogilvie, Mr. R. Pane, Councillor A. Roach, Mr. A. Lister Robinson M.B.E., Councillor Mrs. F.B. Stein, and Councillor E.E. Wright.

The Minutes of the Meeting held in the Amber Valley District on 30th April 1981 were confirmed and signed by the Chairman.

The Secretary apologised for the clash with meetings of National Committees and said that Councillor Chamberlain in particular, had felt it right to attend the Conference and Publicity Committee Meeting.

The Secretary also reported the death of Mr. Henry Nathan ('Nat') Eardly who retired in February 1971 as Chief Public Health Inspector to the (then) Mansfield Borough Council, having served that authority since 1939, first as Deputy Chief Inspector and as Chief Inspector from 1945. Mr. Eardly had died on the night of 21/22 August 1981 in a Nalgo Home in Southsea. He was Chairman of the Division in 1963/64 and was, for a number of years, Honorary Auditor.

At the conclusion of the short business meeting, the Chairman introduced Mr. J.A.H. Oates B.Sc(Chemistry), Section Leader of the Technical Investigatory Section of I.C.I. Ltd. Hindlow. Mr. Oates addressed the meeting on "Environmental Benefits from the Modernisation of I.C.I.'s Lime Plants".

E.F. Raven
Hon. Secretary

COMMISSION ON ENERGY AND THE ENVIRONMENT: COAL AND THE ENVIRONMENT

The Society's Response

In response to the invitation for comments on the above Report the Society notes the conclusions of the Commission on the potential increases in the use of coal by industry and in the commercial/public sector by the turn of the century, and its acceptance that this could aggravate the existing air pollution problem involving an increase in particulate emissions leading to greater dirtiness and consequent loss of amenity. The Society considers that energy policy, particularly with regard to coal use, should have clean air as a priority. In this respect industry should be encouraged to take up Government grant where conversion to coal is made, and Government should apportion some of that grant to proper training of stokers and boiler operators so that grit and dust emissions may be minimised. The Society notes also the view of the Commission that although over the same period there is unlikely to be any appreciable change in the amount of coal burned domestically, the further development of smokeless fuel for smoke control in the domestic sector is unlikely to be a viable option and the more favoured approach could be the design and installation of special smoke-reducing appliances. As far as the latter is concerned, the Society has yet to be convinced that the necessary expertise to burn coal smokelessly is to be found in the ordinary household.

In the light of the foregoing the Society very much regrets that the Commission has apparently failed to recognise that the effectiveness of the Clean Air Acts as they are being implemented is already in disrepute. There is *growing* evidence of the *widespread* use of bituminous coal for domestic heating in smoke control areas, and the report should, therefore, have emphasised a basic requirement for the Acts to be enforced as originally intended as the starting point from which to deal with future increases in domestic and industrial emissions. Moreover the Society is of the opinion that the report has not gone far enough in considering the practical consequences arising from the ever increasing costs of clean fuels: it is concerned that the report underestimates the potential increase in pollution which could result from the burning of coal domestically unless the Acts are enforced as intended. The Society considers, therefore, that the report should have called for a clear statement of intention by the Government for a full programme of smoke control to be progressed throughout the country to be completed by a duly established target date.

NATIONAL SOCIETY FOR CLEAN AIR – NATIONAL POSTER COMPETITION AWARDS MADE BY THE PANEL OF JUDGES

Age Group 13 – 15 years old (as at 24.7.1981)

The Panel of Judges decided to award joint 1st prizes of £150 each, in lieu of the 1st and 2nd prize (£200 and £100 respectively).

1st Prizewinners: Helen Anna Lisa Toyne, of Chiswick, London (Age 15)
James Grenville Brown, of Bude, Cornwall (Age 15)

Awards of £50 each to the respective schools of the top prizewinners were made to:
The Green School for Girls, Isleworth, Middlesex
Bude Haven Lower School, Bude, Cornwall.

Runners-up in the 13 – 15 year age group (£50 each):
Samantha Kate Goates, of Milngavie, Glasgow (Age 15)
Aileen McHarg, of Kilmarnock, Ayrshire (Age 13)

The Judges also exercised their discretion in awarding six 'Commendation' prizes, of £10 each to:
Jackie Claire Barry, of Harlow, Essex (Age 14)
Michael Gaffney, of Whiston, Merseyside (Age 14)
James Sinclair McDougall, of Glasgow (Age 15)
Lesley Anne Syme, of South Queensferry, West Lothian (Age 15)
Sarah Wright, of Hartlepool (Age 13)
Patrick Woods, of Chapelhall, Lanarkshire (Age 14)

……

Age Group 16 – 18 years old (as at 24.7.1981)

Only 68 entries were received in this age group. In view of the disappointing standard overall, the Panel of Judges decided in accordance with No. 7 of the Rules and Conditions of Entry to withold the 1st and 2nd prizes in this age group.

Runner-up Awards of £50 each were made to:
Karen Ann Tucker, of Rochdale (Age 18)
Kim Walsh, of Bury, Lancashire (Age 18)

An award of £50 was made to the Rochdale College of Art.

A 'Commendation' prize of £10 was made to:
Gavin Mitchell, of Glenboig, Lanarkshire (Age 16)

The Society's President, Naomi McIntosh, with Poster Competition top prizewinners, Helen Toyne and James Grenville Brown

LETTERS TO THE EDITOR

Dear Sir

Diesel Fuel Quality

I should like to correct serious misconceptions that could be drawn from the article "Industrial news – Advice on how to cope with Degraded Diesel". These misconceptions relate to

1. The opening statement that "In various parts of the world, the quality of diesel fuel is being degraded, to the extent that both the performance and life of diesel engines would be seriously affected" is quite ambiguous. "Various parts of the world" is a very open phrasing, and I will confine myself to the UK and Western Europe.

   It is true that as newer crude sources arise and replace traditional earlier crudes that become scarcer, and with more restricted choice, the margin of quality in respect of distillate cetane levels is narrowing and that this will call for increasingly intensive refining consideration. However I should note that in the UK national standards such as BS2869, to which the oil industry subscribes, governs the quality of fuels such as diesel fuel. Similar national standards apply in West Germany (DIN), France (AFNOR) and in other countries, and no oil company of standing is going to draw a line through such standards and, arbitrarily, produce or degrade its product so that it no longer meets the purpose for which it is manufactured.

   BS2869 is currently under revision, but the changes proposed will be only comparatively small, and with the full interchange of all the parties concerned, not just the supply interest. Indeed, as has been brought out in the recent deliberation nationally on the question of how to achieve the forthcoming lead reduction in petrol, there can be no separate consideration of fuel characteristics and engine characteristics; the two must go together e.g. a change (reduction) in octane no. would have to be in concert with a change in compression ratio.

2. Long term there may well be the need to extend diesel fuel supply, and to consider various extenders not now conventional, including at some stage synthetic distillates from coal conversion – but this will be a structured approach with the development of the diesel engine to match.

   Thus the diagrammatic "Typical Cetane Number Variations" lacks the qualification of time scale etc; there has been much commercial interest in the international engine industry towards the potential of diesel engine development that will operate satisfactorily on fuels comprising, or containing, gasoline fractions, alcohols or vegetable oils. But these will be new engines based on these new fuels, on which there is considerable future promise; except where the local circumstances of a country perhaps is overriding (for instance a 'biomass' economy), there is no question of arbitrary "degradation" towards existing engines.

I appreciate that the Perkins Engines table on the second page is taking an extremely wide view and has an interest over the far flung world, but it is not without interest in respect of Sulphur content, that the UK – and other European countries both inside and outside of the EEC – from 1977 have brought automotive diesel grade sulphur content down to the level of 0.3 wt% maximum – well below the previous standards.

Yours faithfully,

P. Jones
Assistant General Secretary (Technical)
The Institute of Petroleum
61 New Cavendish Street
London W1M 8AR

Dear Sir,

I would comment on your review on Page 104 of *Clean Air,* Vol. 11, No. 3, of the HSE Guidance Note EH 15/80 (Threshold Limit Values 1980).

TLV-STEL (Threshold Limit Value – Short Term Exposure Limit) is a *maximal* concentration over 15 minutes and not a time weighted average over this period. It also has the stipulation that the excursion from TLV(TWA) to TLV(STEL) should only take place 4 times in a normal 8 hour worday with at least 60 minutes between excursion periods.

Yours faithfully

Howard Rayson
20 Cranbury Place
Southampton
SO2 0LQ

EDITOR'S REPLY:

Academically, Mr. Rayson is quite correct to point out the discrepancy between the definition of TLV-STEL in the Guidance Note and that given in our review. Our definition, however, was based on UK (HSE) practice. Sampling for workers' exposure is carried out using personal samplers with a minimum sampling period of 15 minutes. Therefore, the STEL is automatically a time weighted average over 15 minutes.

FORTHCOMING CONFERENCES AND COURSES 1982

2 – 3 February	Brussels. **Seminar on Acid Rain in Scandinavia: The European Community's Responsibilities.** *Organisers:* The European Environmental Bureau (EEB), 29/32 Rue Vautier, B 1040 Brussels.
15 – 18 March	Course. **Noise & Safety at Work.** *Organisers:* Centre for Extension Studies, University of Technology, Loughborough, Leics. Fee (inclusive of residence/course material): £275.00.
22 – 25 March	Course. **Water Use and Effluent Disposal – Reducing Costs in Industry.** *Organisers:* Centre for Extension Studies, Loughborough University. Fee (inclusive of residence/course material): £275.00.
24 – 28 May	Maastricht, The Netherlands. International Symposium. **Pollution Problems related to Nitrogen Oxides.** *Organisers:* US Environmental Protection Agency & Ministry of Health and Environmental Protection, The Netherlands. *Details:* Dr. J. van Ham, SCMO-TNO, P.O. Box 186, 2600 AD Delft, The Netherlands. Tel: 015-569330 ext. 2446. Telex: 31453 zptno nl. Fee: advance registration: f. 300 (approx £60.00) on site reservation: f. 400 (approx £80.00) Note: The working language of the Symposium will be English.

13th NATO/CCMS International Technical Meeting on Air Pollution Modeling and its Application

The 13th I.T.M. on Air Pollution Modeling and its Application will be held from 24 to 27 August 1982 in the South of France.

Topics which will be emphasized and for which papers are invited include:

1. Lagrangian modeling (Main topic)
2. Modeling cooling tower and power plant plumes and their interaction
3. Modeling the dispersion of heavy gases
4. Remote Sensing as a tool for air pollution modeling (excluding description of measurement techniques)
5. Dispersion modeling including photochemistry
6. Evaluation of model performances in practical applications.

Intention to participate or to offer a paper together with title and short abstract (200 words) for proposed papers must be received NO LATER THAN 28 FEBRUARY 1982 by: Chr. DE WISPELAERE, Prime Minister's Office for Science Policy Programming, Wetenschapsstraat 8, 1040 BRUSSELS, BELGIUM

Complete papers will be published in the conference proceedings.

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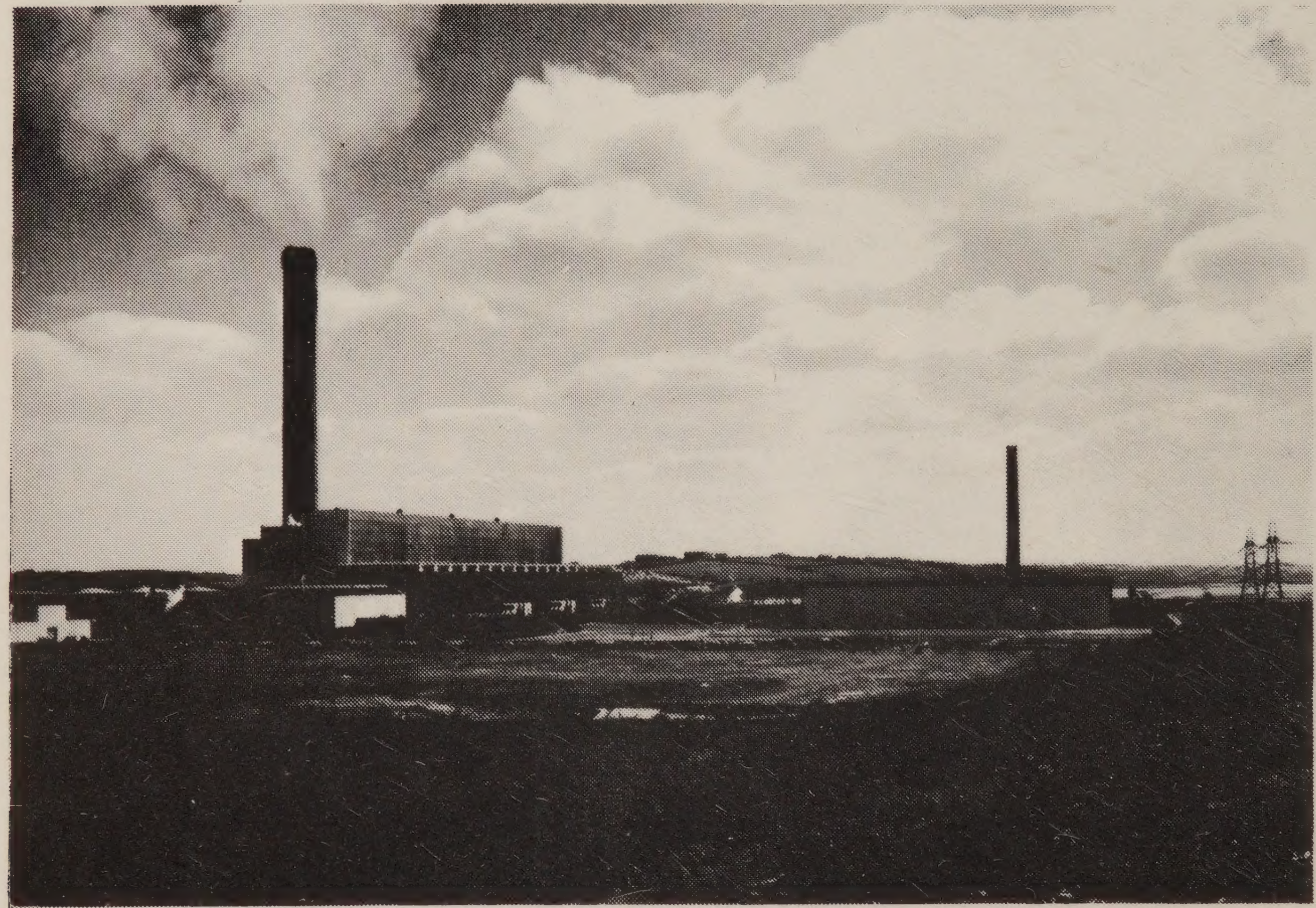

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They include the Arnold Marsh Clean Air Award, two Prince of Wales Awards, four from the Business and Industry Panel for the Environment, six RICS/Times Conservation Awards and nine Wales in Bloom Awards.

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